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SHOP EQUIPMENT REVIEW

Semi-Annual Résumé of Machines, Tools and Accessories described in the Shop Equipment News Section of *American Machinist* during the last Six Months of 1927

Principal Developments

THE tenth semi-annual shop equipment review number of the *American Machinist* covers in the American section 410, and in the European section, 72 machines and pieces of equipment described during the six months period ending Dec. 31, 1927. The period has been one of wide development and complete modernization of all kinds of equipment. In fact, there are here described the largest number of machines ever collected during a similar six-month period. This situation is due largely to the impetus given to machine tool builders by the exposition held in Cleveland last September by the National Machine Tool Builders Association.

As in the previous six months, there is still a trend toward single-purpose equipment of the manufacturing type and away from machines of a more universal nature. This trend is even now reflected in English equipment.

In general, improvements continue to follow three main lines: Greater rigidity, so that accuracy can be maintained with modern heavy feeds and speeds; anti-friction bearings; and better lubrication of vital parts, usually automatically. The application of hydraulic power to machine tools is also in evidence, particularly on unit boring and drilling machines and on grinders. Hydraulic drive has also been applied to a line of milling machines during this period. Self-contained motor drive is now the rule, rather than the exception, and pulley drive is usually optional.

Boring machines of all types have appeared, among them being several large-size combination boring, drilling and milling machines for handling big pieces with few changes of set-up. A jig borer capable of handling work in three co-ordinates is also noted.

High-production drilling machines are of the single-purpose type. One such machine has all working parts totally inclosed. It is also interesting to note the large number of portable electric drills, with particular emphasis on the popular $\frac{1}{2}$-in. size.

It is possible now to generate worms on an automatic screw machine with the aid of a special attachment. Machines are also available for cutting spiral bevel gears up to 60 in. in diameter. Contrary to the experience of the previous six months, however, few developments have taken place in standard spur-gear cutting equipment.

As usual, grinding equipment descriptions occupy the largest space. The application of hydraulic power to the table feed is particularly in evidence. Among the various grinding developments, the following machines are noted: Several full automatic types; one extra-large internal grinder; an automatic reamer sharpener; a number of portable air-driven grinders; and many special-purpose grinders. An unusually large number of grinding attachments are also described.

Whereas in the first six months of 1927 few developments took place in lathes, in the last six months a large number of modernized models has been brought out, in both the engine and the turret type. In practically all cases, alloy-steel gears, anti-friction bearings, and simplified control are featured. Besides standard equipment, many special lathes have been introduced. Several automatic lathes for high production work are noted. One is a vertical turret type. All are built extremely rigid and have a wide range of speeds and feeds.

In the milling machine section will be found several improved manufacturing types, one featuring hydraulic reciprocation of the table. There is also a tilted offset miller carrying a large-size cutter, having a large portion of its periphery in the cut at once.

Templet control for contour work has also been applied to a planer. Several improved types of planers are described, but a much greater number of shapers were introduced during the period. The improvements made have largely been refinements. Several developments have also taken place in presses. The tendency is toward high speed operation. One extra large press, weighing 600,000 lb., is described. Another has a nibbling attachment for use with templets instead of large dies.

Here and there scattered descriptions stand out: A special broach for finishing flats on small parts on a production basis; a high-production bolt former and threader; a power scraper; a portable power shear; an atomic-hydrogen welding outfit; a constant-diameter hardness indicator; numerous testing machines, including a 1,000,000-lb. testing machine, and a dynamic balancing machine of original design.

CONTENTS OF THE REVIEW PAGES

American Edition

	No.	Page
Boring and Turning Machines	**1-15**	**79**
Vertical	1–3	79
Horizontal	4–11	79
Jig	12–14	81
Jig boring attachment	15	81
Drilling Machines	**16-39**	**81**
Upright	16–18	81
Radial	19–20	82
Multiple	21-22	82
Horizontal	23	83
Unit	24–26	83
Portable	27–33	83
Attachments	34–39	84
Gear Cutting and Testing Machines	**40-47**	**85**
Hobbers	40–42	85
Shapers and generators	43–45	86
Miscellaneous	46–47	86
Grinding Machines	**48-112**	**87**
Face	48–51	87
Surface	52–59	87
Disk	60–63	88
Cylindrical	64–66	89
Internal	67–72	90
Stands	73–77	91
Portable	78–82	91
Tool	83–86	92
Special-purpose	87–94	93
Attachments	95–112	94
Lathes	**113-141**	**96**
Engine	113–118	96
Turret	119–126	97
Special	127–134	99
Attachments	135–141	100
Milling Machines	**142-150**	**101**
Manufacturing	142–144	101
Knee	145	102
Special	146–150	102
Planers, Shapers and Slotters	**151-165**	**103**
Planers	151–154	103
Shapers, Crank	155–161	104
Shapers, Draw-Cut	162-164	105
Slotter	165	105
Presses	**166-178**	**105**
Power and punch	166–174	105
Forcing and bending	175–177	107
Hydraulic	178	107
Shearing and Punching Machines	**179-185**	**108**
Combination	179–181	108
Miscellaneous	182–185	108
Threading Machines	**186-201**	**109**
Tapping and threading	186–192	109
Thread milling	193	110
Bolt, nut and pipe threading	194-198	110
Attachments	199–201	111
Other Machines	**202-269**	**111**
Broaching	202	111
Engraving	203–205	112
Finishing	206–211	112
Hammers	212–217	113
Marking	218–220	114
Sawing	221–226	115
Screw and nut driving	227–229	115
Straightening	230–231	116
Swaging	232–233	116
Turning	234–237	117
Welding, arc	238–242	117
Welding, spot	243–249	118
Wire cutting	250–251	119
Miscellaneous	252–269	120
Material Handling	**270-278**	**122**
Hoists	270–273	122
Tractors and trailers	274–278	123
Woodworking	**279-284**	**124**
Balancing, Gaging and Testing Equipment	**285-304**	**125**
Small Tools	**305-329**	**128**
Cutters	305–308	128
Reamers	309–311	128
Taps and dies	312–314	128
Wrenches	315–317	129
Miscellaneous	318–329	129
Transmission Equipment	**330-339**	**130**
Welding Equipment	**340-345**	**132**
Electrical Equipment	**346-369**	**133**
Motors and generators	346–353	133
Controllers	354–362	134
Miscellaneous	363–369	135
Lubrication Equipment	**370-374**	**136**
Miscellaneous Equipment, Materials and Supplies	**375-410**	**137**

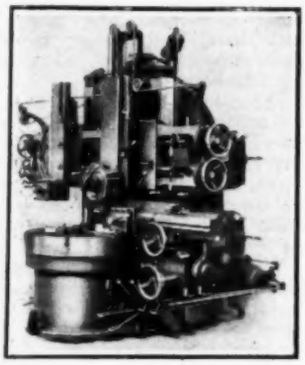
Boring and Turning Machines

— 1 —

Boring and Turning Machine, Vertical Heavy-Duty

King Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.408]

An improved line of heavy-duty vertical boring and turning machines is available in 30-, 42-, 52-, 62-, 72-, 84- and 96-in. sizes. The improved line departs from the standard, principally in the construction of the drive and feed mechanism. The gears in the drive are made of steel in place of cast iron and all the pinions of alloy steel, heat-treated. The shafts have been increased in diameter. A multiple-disk clutch and integral brake is used for controlling the drive in conjunction with two treadles.



The feed mechanisms are independent for each head. Twelve rates of feeds are available, ranging from a minimum of 1/96 to a maximum of ½ in. per rev. of table. The control of the feeds is made at the ends of the rail and separate levers are employed for the vertical and horizontal feeds. A screw cutting attachment is available for cutting the usual pitches from 2 to 12 threads per inch.

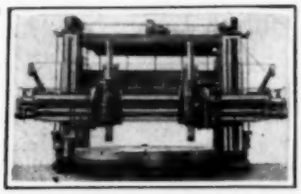
These machines can be equipped with one or two heads on the rails, either with or without a side head. The side head is fitted directly to the column and has an entirely independent feed and rapid traverse. Two swivel heads may also be provided on the rail or a right-hand vertical turret and a left-hand swivel head.

— 2 —

Boring and Turning Mill, 20-Foot, Niles

Niles Tool Works Co., Division of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.67,p.674]

Slightly increased capacity and a number of additional features over the 18-ft. mill are



noted in this 20-ft., heavy-duty boring and turning mill. The right-hand housing has been built considerably heavier than the left-hand housing, and the housing space widened and provided with a three-track bearing to receive a side head.

For the purpose of cutting tapers the feed for either the saddle or bars may be engaged simultaneously in conjunction with the swiveling of the saddle. The motors for the rapid traverse of the bars and saddles are located at each end of the rail. The rail is clamped to the housing by four electric clamping devices, two for each housing.

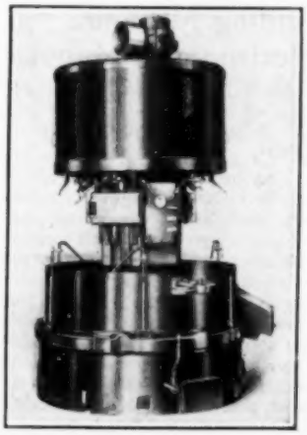
The main drive is through a 50-hp., variable-speed d.c. motor, while a 20-hp. motor is used to elevate the cross-rail. Other features, such as double table tracks with pressure lubrication, steel bars, sliding-gear feed boxes, cross-rail of square box-section with stiffening beam, direct-reading micrometer dials for saddle and bar movements, and limit switches for the elevation of the cross-rail are all embodied in this mill.

— 3 —

Mult-Au-Matic, Six-Spindle, 20-Inch

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.67,p.920]

This 20-in., six-spindle, Mult-Au-Matic provides a clear swing of work 21½ in. in diam. at 8 in. above the chuck face, and 12 in. in diam. for chucked work, extending 17 in. high. The work is chucked by the operator at the loading station,



is periodically indexed through each of the five working stations, and finally returned for unloading. At the loading station there is a power-driven chuck operating unit.

Tool heads provided at the five working stations may be of plain, compound, standard universal or double-purpose type providing respectively vertical, horizontal, angular, or a combination of vertical and horizontal tool traverse and feed. The full stroke of the head comprises 8¾ in. of primary vertical movement, which, in the compound head, may be transformed to 4¾ in. vertical and 4 in. horizontal movement.

The available spindle speeds may be independently selected at each station and range from 5.3 to 131.7 r.p.m., in 25 steps. Nineteen changes of tool feeds are also provided for each head.

The general construction of the 20-in. Mult-Au-Matic is similar in practically every unit to the other sizes except, of course, its increased size permits a heavier construction. The machine can be arranged for either direct motor drive or belt drive. Under average conditions, a 15-hp. motor is required.

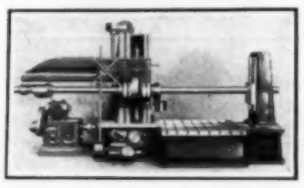
— 4 —

Boring Machine, Horizontal, Adjustable

Barrett Machine Tool Co., Meadville, Pa. [Vol.67,p.35]

The horizontal boring machine shown has a vertically adjustable spindle for different classes of work. The machine is manufactured in 3-, 3½-, 5- and 6-in. bar sizes.

The bed and column are of box-type construction. The saddle is cast in one piece with the extension. It is provided with vertical adjustment on the



face of the column by means of an elevating motor or hand wheel.

The boring bar is made of hammered steel and slides in cast-iron sleeves, being driven by a long key. A regular quick-change feed mechanism provides the usual range of feeds. A reversing mechanism is also included. The outer support of the bar is of the housed type and has vertical hand adjustment.

Drive for the bar is through a speed box driven by a constant-speed motor. All gears are made of steel and run in oil. Belt drive can also be furnished.

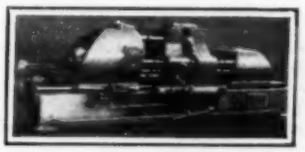
The facing arm is mounted on the end of the bar sleeve and is driven by friction.

— 5 —

Boring Machine, Horizontal, Duplex

W. F. & John Barnes Co., Rockford, Ill. [Vol.67,p.206]

The machine can be used for simultaneous drilling, boring, hollow milling, box milling, line reaming, chamfering and facing to accurate depths. The left head contains ten spindles in



five groups of two each and the right head four spindles in two groups of two each.

The spindles are mounted in Timken roller bearings and are driven by hardened steel gears. Cascade lubrication is employed. Each spindle has nose adjustment to provide for accurate tool setting.

Each drill-head carrying unit is separately cast and is bolted to the saddle. The spindles are driven by motors mounted on the rear of each head. The bed is cast of semi-steel in one piece with heavy cross ribs for rigidity. In the center is a large chip pan and, along the sides, coolant troughs.

The boring heads are fed hydraulically by means of an Oilgear pump. One cylinder feeds both heads through a rack and pinion arrangement and practically any desired rate of speed may be obtained. The cycle is rapid traverse forward, slow feed, and automatic quick return.

The six-station trunnion fixture provides for loading two castings in each station. Five stations are operated, while one is being loaded.

Weight, including motors, 18,000 pounds.

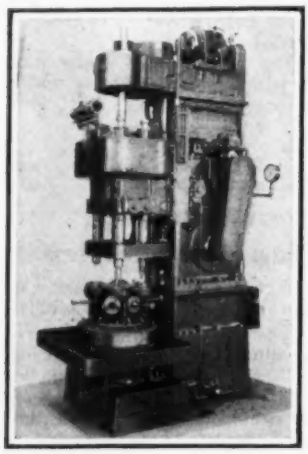
— 6 —

Boring and Drilling Machine, Hydraulic-Feed, No. 25H

Baker Bros., Inc., Toledo, Ohio. [Vol.67,p.386]

The No. 25H boring and drilling machine is a production type unit having geared motor drive for the operation of the spindles in the head, and an Oilgear hydraulically-operated feed mechanism.

The machine is of the sliding saddle type, and can be furnished as a single-spindle unit,



or with multiple spindles. It is especially adapted for work in connection with an indexing table. The heads carrying the spindles are made special, depending upon the nature of the work to be machined.

The Oilgear feed has a rapid traverse for lowering the head to any predetermined location, after which the cutting feed is engaged and an automatic quick return. The cycle is controlled by adjustable cams. The pump is installed inside the frame and is driven by a 1½-hp. motor.

The main motor drive is mounted on top of the machine. The heads are provided with hardened alloy-steel gears mounted on ball bearings. The machine illustrated has a five-spindle head and a six-station table.

— 7 —

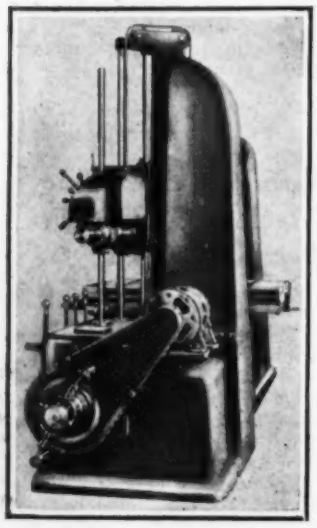
Boring Machine, Tri-Way, Heavy-Duty, No. 24

Universal Boring Machine Co., Hudson, Mass. [Vol.67, p.382]

The heavy-duty model No. 24 Tri-Way boring machine was designed to meet the demand for greater vertical range and to provide maximum boring and milling capacity when operated at the limit of travel.

Increased capacity has been secured by complete redesign of the head and rear posts. At the same time, the main driving clutch and the clutch for reversing the spindle have been increased in capacity to provide greater power. The new design is offered in a variety of combinations of size of bed, vertical travel of head and size of table, to meet the needs of the individual requirements.

The heavy-duty machines are all equipped with 3-in. spindles, and vary in weight according to dimensions from 14,500 to 17,500 lb. The maximum specifications of the heavy-duty No. 24 machine are as follows: Distance from top of table to center of boring bar 40 in.; size of table 32x52 in.; capacity to take 8 ft. between face plate and rear bearing.



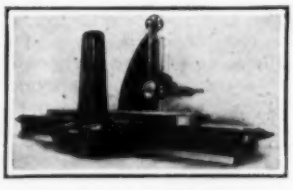
— 8 —

Boring, Drilling and Milling Machine, Horizontal, No. 45-P Planer-Type

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. [Vol.67,p.597]

Precision with increased capacity is the keynote of this planer-type horizontal boring, drilling and milling machine. In the construction of the unit this company's standard spindle head of compact design is employed.

The complete machine is made up of three main units: the head, column and all the sub-units for the speed and feed



constitute one unit; the end support and its bed another unit placed on the opposite side of the table, while the planer bed and table placed at a right angle to the spindle comprise the third unit.

The end support, the column and their corresponding beds are of the same general design as the No. 45 machine except that the parts are much larger and heavier. The table and bed are of heavy construction and are provided with force-feed lubrication to the ways. The table is arranged for hand or power feed and rapid traverse in either direction.

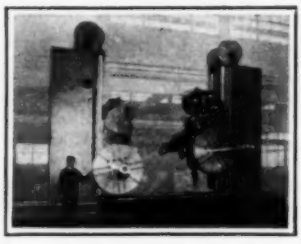
Spindle speeds range from 7 to 220 r.p.m. The spindle travel is 66 in. The table has a working surface of 168x52 in., and a cross travel of 166 inch.

— 9 —

Boring and Drilling Machine, Horizontal, Double, Large-Size

Betts Works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y. [Vol.67,p.677]

While the large-size special horizontal boring and drilling machine shown was particularly designed for the economical performance of boring operations on cast-steel locomotive frames having the cylinders cast integral with the frame, it is adaptable to a wide range of boring



and drilling operations on large work.

The machine has a long bed on which two columns are mounted, each column carrying a saddle with the necessary mechanism for driving, feeding and rapid traversing the spindles. Both spindles are 9 in. in diam. and in addition to direct drive, are provided with internal faceplate drive for heavy boring. Each saddle carries its own driving motor and is equipped with an operator's platform from which all movements of the unit and spindle are controlled. Separate motors provide rapid traverse, and separate motors are also used to move each column along the bed.

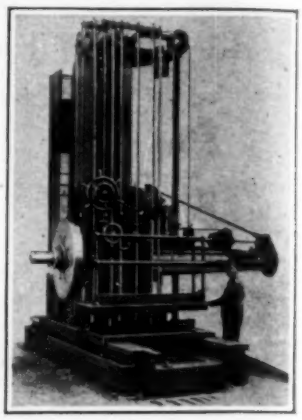
Among the miscellaneous equipment supplied are boring bars, boring heads, facing heads and centering devices. Each spindle also has an outboard support for the boring bars.

— 10 —

Boring, Drilling, and Milling Machine, Horizontal, Improved

Niles Tool Works Co., Division of the Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.67, p.880]

The improvements include a totally inclosed saddle and drive box with automatic circulating lubricating system to all important gears, shafts, and bearings; drive and feed gears of steel throughout; screw feed to the spindle; power rapid traverse to the spindle by means of a separate motor; more convenient and centralized grouping of controls, and the use of inset scales



on the face of the column and ways of the bed.

These machines are built in sizes having spindle diameters of 6, 7, 8 and 10 in. For drilling and other operations requiring relatively high speeds, the spindle is driven through its sleeve, while for boring and milling operations, the drive is through a faceplate gear and pinion. Both hand and power rapid traverse are provided, as well as a fine hand feed.

The column is mounted on a two-track bed on which it has reversible power feed and rapid traverse, as well as hand adjustment. The saddle traverse on the column is regularly 96 in., while the column traverse on the bed is 120 inches.

With the machine may be furnished a floor plate with T-slots. An outboard column, either plain or mounted on a sub-base, is also available. The sub-base has screw adjustment on the floor plate parallel with the axis of the spindle. Scales are provided for all movements.

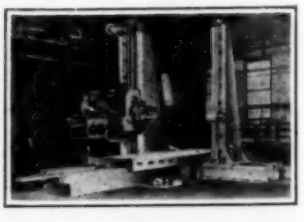
The machine is driven by a 15-hp. motor mounted on the gear box. The motor shown is a variable-speed, d.c. type. The drive may also be arranged for a constant-speed motor through a gear box having eight mechanical changes of speed.

— 11 —

Boring, Drilling and Milling Machine, Horizontal, with 7-Inch Spindle

William Sellers & Co., Inc., Philadelphia, Pa. [Vol.67,p.1032]

The work head is mounted on a heavy column and is counterweighted for easy motion. Power traverse and a large



series of milling feeds as well as boring and drilling feeds are available on the work head. A movable table, also provided with power traverse and milling feeds, carries the work. For boring operations an outboard support is used to carry the bar.

The spindle on the work head is 7 in. in diam. and has 5 ft. of continuous stroke. The travel of the head vertically is 11 ft. and of the table 16 ft. horizontally. The table is 6 ft. wide and is 18 ft. long.

A 15-hp. variable-speed motor is mounted directly on the work-head and drives through a gear train made up entirely of spur gears. It is lubricated from a centralized tank. The speeds range from 2 to 200 r.p.m. The same motor that drives the spindle also provides power traverse of 7½ ft. per min. and milling feeds from ¼ to 18 in. per min. vertically.

Quick traverse and feed for the table is provided by an adjustable-speed motor. The table drive is through a regular Sellers spiral pinion and rack.

— 12 —

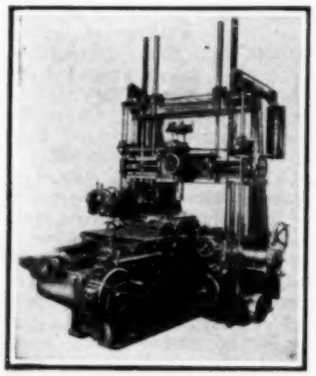
Boring Machine, Jig, Société Genevoise

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol. 67,p.380]

The locating and jig boring machine has three spindles and performs the work in three co-ordinates. The same principles of measurement and drive are used as in the other machines imported by this company.

The bed of the machine has a rectangular table 51x28 in. The cross-rail can be raised or lowered through a range of 25 in. A slide on this cross-rail carries the vertical spindle and has a cross motion itself of 28 in. These horizontal spindles are accurately moved through 30 in. by compensated screws. The maximum height of the vertical boring head above the table is 30 in., while that of the horizontal boring head is 24 inches.

Facilities are provided for lining up the work, consisting of a spindle microscope, a reference square, a dial indicator device and a semi-automatic precision center punch.



A 9-speed gear box driven by a single pulley, gives spindle speeds varying from 40 to 300 r.p.m. A driving motor may be mounted on the rear of the machine, or two pulleys can be supplied for countershaft drive.

A special circular table has also been designed for this machine, for use in work in polar co-ordinates. The maximum diameters of holes that can be drilled are 1¾ in. in soft steel, or 1⅞ in. in cast rion. The maximum diameter for boring is 6 in. and depths of holes up to 12 in. are possible.

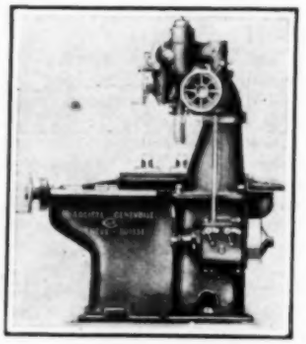
Floor space 11½x9 ft.; weight, 13,000 lb. net.

— 13 —

Boring Machine, Jig, No. 3, Société Genevoise

R. Y. Ferner Co., Investment Building, Washington, D. C. [Vol.67,p.485]

The Model No. 3 machine is midway in capacity between the Nos. 2 and 4 jig boring machines, and is similar in design. The cross rail, however, is not raised and lowered, but connects the uprights rigidly. The table measures 16x24 in. and has a travel on its ways of 16 in. The cross travel of the spindle slide is 12 in. The maximum height of the boring head above the table is 12 in., and the feed travel of the spindle is 6½ in. For flat work, two



cross ways are provided for use on the table.

As before, measurement is by accurate micrometer screws compensated for errors. The accuracy is claimed to be within 0.0002 inch.

The maximum drilling capacity is 1 in. in soft steel, and the boring capacity is 4 in. Three automatic feeds of the spindle are provided and four speeds, 75, 150, 300, and 600 r.p.m. All shafts are mounted in ball bearings and all gear housings are provided with an oil bath.

The standard accessories include a special circular table and spindle microscope and a centering dial indicator for locating the circular table.

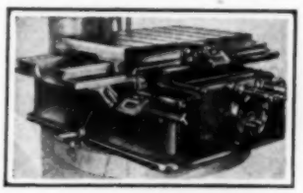
Floor space 51x57 in.; height 72 in.; weight 2,650 lb. net.

— 14 —

Boring Unit, Jig, "Kellocater"

Keller Mechanical Engineering Corporation, Brooklyn, N. Y. [Vol.67,p.389]

The "Kellocater" electrically-controlled jig boring unit was designed for accurate locating and jig boring without the necessity of layout work. Any drill press with a good spindle



and having a distance of 14 in. or more from the center line of the spindle to the face of the column is suitable for the operation of the device. The unit is simply clamped to the machine table.

The operating mechanism of the Kellocater unit consists of an electric motor driving the longitudinal and traverse lead screws, and actuating the two table slides through a magnetic clutch. The circuit of the clutch is under control of a relay and two stop contactors set by vernier slides. The motor moves either table slide until the electric contactor on the table slide touches the end of the vernier slider, thus opening the circuit and stopping the motion.

The table of the machine measures 14x20 in. The corresponding machine travel is 12x18 in. Work considerably larger than the table can be handled, however, since three slides are clear of obstruction.

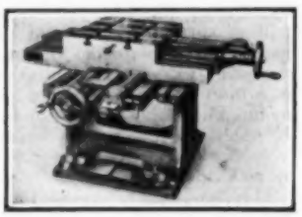
— 15 —

Jig Spacer, "Johnson"

Trundle Engineering Co. Cleveland, Ohio. [Vol.67,p.524]

Any standard vertical milling or drilling machine may be converted into a jig borer through the use of the "Johnson" jig spacer. The unit may also be used on a shaper, planer or slotter for accurate spacing work. It is compact and rigid in construction and is readily portable.

The fixture consists of a base upon which is mounted two slides that travel at a right angle to each other. Accurate



control of spacing is obtained by using standard end-measuring gages in conjunction with indicators.

The work table measures 16x16 in. and has a travel 15 in. with an overhang of 3 in. The length of the short slide is 26 in. while the length of the long slide is 32 in., providing a longitudinal travel of 15 in.

Floor space 37x45 in.; weight 525 lb. net.

Drilling Machines

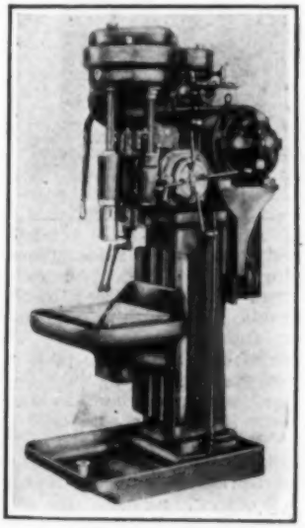
— 16 —

Drill, Production, "Super-Service"

Cincinnati Bickford Tool Co., Oakley, Cincinnati, Ohio. [Vol. 67,p.409]

The "Super-Service" production drill is essentially a one-speed, one-feed, single-purpose machine. It is stripped of the features usually found on general-purpose machines, but flexibility has been obtained in the design, so that by merely transposing gears sixteen speeds and sixteen feeds can be obtained.

The available speeds range from 263 to 1,233 r.p.m. The gears are of heat-treated alloy steel and each shaft revolves in ball bearings. The feeds range from 0.0004 to 0.025 in. Both gears and the shafts are of heat-treated alloy steel and the feed gear train is lubricated by a splash system. A tapping attachment is also provided.



The spindle runs in roller

bearings and the feed pressure is taken by large ball thrust bearings. The spindle is made of special alloy steel and is multiple splined.

The drive is by an inclosed silent chain. Belt drive can also be provided. The column is made in two sections so that raising blocks may be used. For gang drill construction it is merely necessary to mount the required number of upper sections on a common base.

—17—

Drilling Machine, High-Production

Hoefer Manufacturing Co., Freeport, Ill. [Vol.67,p.417]

The entire driving mechanism is built within the column and the head so that all protruding attachments have been eliminated in this high-production drilling machine. It can be operated as a plain drilling machine or with such appliances as a multiple head, fixtures and an indexing table. The number of indexes of this table range from 2 to 10 and are controlled by pick-off gears.

The head has the spindle drive and feed units as well as a 5-hp. motor contained in it, and a housing attachment to the head completely covers the spindle and the counterweight.

When multiple-spindle heads are used they are bolted directly against the head of the machine

and special table feeds are employed. They can be either screw feed, cam feed or hydraulic feed with either hand or automatic operation. The feeds furnished to the table include rapid-approach, slow feed, rapid withdrawal and an automatic stop.

All bearings are either of the ball or roller type. A one-shot lubrication system is provided.

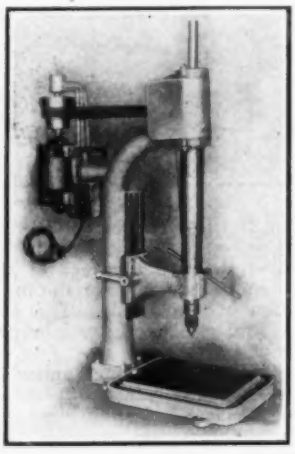
Working surface of plain table 18x24 in.; table travel 16 in.; speeds 100 to 600 r.p.m.; floor space 30x50 in.; net weight 3,000 lb. approximately.

—18—

Drill, Sensitive, High-Speed, 14-Inch

Canedy-Otto Manufacturing Co., Chicago Heights, Ill. [Vol. 67,p.521]

This 14-in. high-speed sliding head sensitive drill will drill holes up to $\frac{7}{8}$ in. in diam. The unit is equipped with a vertical type motor driving direct to the spindle and attached in such a



manner that it can be adjusted in position to give the desired belt tension. The driven pulley is mounted on a quill carried on ball bearings. The sliding head is counterbalanced. All moving members are amply protected to insure safety.

The spindle speeds of 3,400, 5,600 and 10,000 r.p.m. are available by means of the three-step cone pulley. The spindle has a travel of 3½ in. while the head has a vertical adjustment of 7½ in. The maximum distance under the chuck is 10½ in. and the maximum distance from the column to the center of the spindle is 7½ in. The table measures 9½x12½ inches.

Bench space 15x20 in.; height 41 in.; weight 180 lb. net.

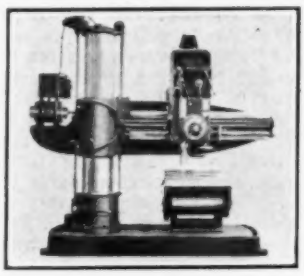
—19—

Drill, Radial, Heavy-Duty

Fosdick Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.373]

One of the outstanding features of this line of heavy-duty radial drills, made in 5-, 6- and 7-ft. sizes, is the fact that all control movements are operated from the head. The machines are built upon the unit principle and are automatically lubricated. The manufacturer points out the following additional features:

A table that can be tilted and clamped at any angle; base, column, sleeves and arms made of semi-steel of massive construction; a base of deep box section with a large working surface; a large diameter column,



and a column sleeve with increased clamping area.

Two sets of spindle speeds are available ranging from 14 to 1,010 r.p.m. and from 20 to 1,406 r.p.m. depending upon the speed of the motor. A total of 36 speed changes are provided controlled by three levers. There are a total of 18 spindle feeds available ranging from 0.003 to 0.125 in. per rev. A safety interlock prevents the throwing in of heavy feeds at high speeds. Safety knockouts are also used.

A constant-speed motor drives the spindle, the vertical operation of the arm, and the horizontal movement of the head. Ball and roller bearings are used on the drive. The machine can be furnished with the motor on the arm or on the base or can be arranged for single pulley belt drive.

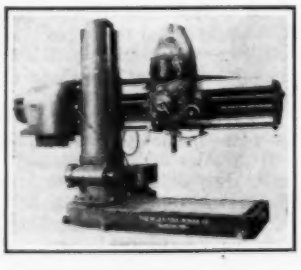
—20—

Drill, Radial, Heavy-Duty, No. 25

Niles Tool Works Co., Division of the Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.67, p.451]

To supplement its No. 19 medium duty, "Right Line" radial drill, the heavy-duty radial drill, known as the No. 25 Right Line, was developed. The machine is of plain radial type driven by a variable-speed d.c. motor. The drilling radius is 6 ft. in the machine illustrated, but the drills will also be built in 7- and 8-ft. arm lengths. Drives may also be obtained by constant-speed motors.

All speed changes are embodied in the head through selective sliding gears. The entire spindle drive, including the arm shaft, is mounted on ball and roller bearings. The minimum speed is 12 r.p.m. and the maximum 1,200. In the d.c. drive machine, there are three mechanical changes in speed, shifted by one lever, combined with the variation of the motor



speed. In the constant-speed drive there are 24 spindle speeds, all obtained mechanically.

There are sixteen feeds, ranging in geometric progression from 0.005 to 0.125 in., including pipe tap leads also for 8, 11½ and 14 threads per inch. The head is inclosed in an oil-tight and dust-proof case, and the gears and shafts are lubricated by a pump inside the head.

The head is moved along the arm either by hand or by power. The arm is supported and slides on the column on four V-ways. A single lever is used to elevate or lower the arm or to clamp to to the column.

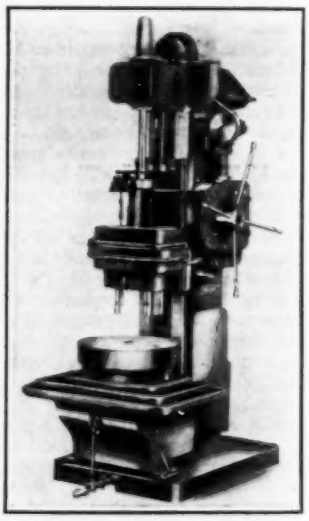
Height of plain table 20 in., top surface of plain table 28x30 in., side surface 30x14 in.; weight of machine 28,000 lb. net.

—21—

Drilling Machine, Multiple-Spindle, No. 15½-F, Footburt

Foote-Burt Co., Cleveland, Ohio. [Vol.67,p.212]

The Footburt No. 15½-F multi-purpose machine is equipped with a flanged sliding unit to which multiple heads may be bolted. To change from one job to another it is only necessary to change the head.



Two dowels in hardened steel bushings are used to locate the heads accurately in the slide.

With the exception of the flanged-type slide, the machine is of the same design as the regular No. 15½-F drilling machine, and may be arranged for either motor or belt drive. Positive lubrication is featured.

The circular table is of the three-position indexing type. It is possible to furnish a two-position table so that one or more pieces may be loaded while the machine is in operation. Either stationary box table, as illustrated, or a vertically adjustable table, can be supplied.

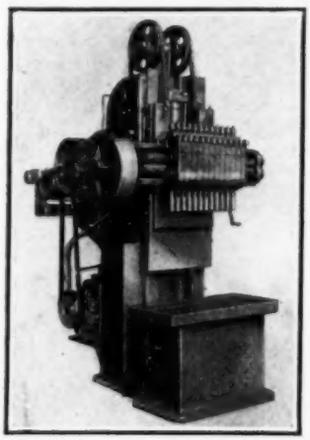
— 22 —

Drilling Machine, No. 115-D, "Hole-Hog"

Moline Tool Co., Moline, Ill. [Vol.67,p.414]

The "Hole-Hog" No. 115-D drilling machine is intended to supersede several types of the old machines, particularly those used in the manufacture of valve parts.

The machine consists of a box-section column, extending to the floor and having guides running the full length. The column has wings to which the



base is securely bolted. A U-shaped base is used to prevent interference with the slide.

The rail carrying the drive spirals and the spindle heads can be placed at varying heights with respect to the table. Drive is by motor. Pick-off gears are used to give speed changes. The same motor that drives the machine also drives the Oilgear feed pump. The cycle of operation is automatic.

The machine shown has twelve 2-in. heads on the rail, but any BV type of head or special heads can be applied to give the center distances required. The minimum center distance that can be obtained is 2 in. and the maximum center distance 40 in. The travel of the rail is 24 inches.

Floor space 4 ft. 10 in. x 6 ft.; shipping weight 10,000 lb., approximately.

— 23 —

Drill, Horizontal, No. 00 Duple

John B. Stevens, Inc., 27 Cleveland Place, New York, N. Y. [Vol.67,p.514]

To meet the demand for a horizontally-opposed spindle machine for reaming, chamfering, beveling, counter-boring or drilling, the No. 00 Duple horizontal drilling machine was designed. Two high-speed spindle heads are movably mounted

upon the ways, which extend the entire length of the bed top.

The bed is deep and amply cross-ribbed, and rests on substantial floor legs. A pan, pump, and fixture table can be supplied extra. A centrally-located pilot wheel moves both heads simultaneously toward each other through racks and pinions. This rack feed permits a fast speed, and a fast return of the heads.

The spindles revolve in large ball bearings properly protected from dirt. The front faces of the heads are machined to permit the attaching of multiple spindle drill heads and die or tapper-head bodies.

The machine can be furnished plain, as shown, or in the following forms: Hand feed with integral motor drive; countershaft drive with both hand and power feed; power feed with motor drive; cam feed; and cam feed with motor drive.

Bed lengths, 36 to 48 in.; max. and min. distance between spindles, 21 and 4 in.; weight, 450 lb., crated.

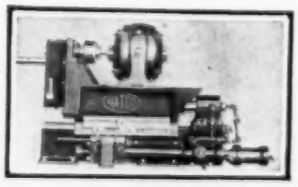
— 24 —

Drilling Unit, Hydraulic-Feed, 4-Inch, Natco

National Automatic Tool Co., Richmond, Ind. [Vol.67,p.384]

This high-speed, hydraulically-operated drilling unit, with 4-in. capacity, is a sliding-head type with the motor and spindle box forming a complete unit with individual feed-control valves, operated by dogs. The automatic cycle of the unit consists of rapid forward traverse, slow feed, rapid return and stop.

The maximum head travel is 11-in. It is claimed that the unit will drive two 1-in. drills at 0.01-in. per rev. in cast iron or the equivalent, while the feeding rate can be set from 0 to the rapid traverse rate of approximately 75 in. per minute. The weight of each unit is



700-lb. A 3-hp. motor is recommended for capacity drilling.

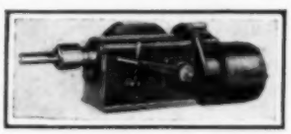
The unit may be arranged horizontally, vertically or at any angle. When the units are mounted in multiple, they are started simultaneously from a single valve, but the operation of each is independent of the other.

— 25 —

Drilling and Tapping Head, Unit

Demco Drilling Machine Co., Cleveland, and The Bradford Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.556]

These companies are jointly placing on the market two sizes of a unit type drilling and tapping head. These heads are of the self-contained type, with the



motor and feed mechanism built into a compact unit. One or more heads can be built into a machine at any angle from the horizontal to the vertical.

The heads operate on a predetermined cycle, having a definite spindle travel of 3 in. The cycle consists of rapid approach to the work, cutting feed and a rapid return after the operation is completed.

By means of pick-off gears, the spindle speeds can be varied from 75 to 2,000 r.p.m. The feed can also be varied by means of pick-off gears.

The tapping mechanism is built into the head and employs a positive rise cam for advance and withdrawal. Thread leads from 8 to 32 threads per in. can be obtained with standard pick-off gears.

The No. 1 head requires a 1-hp. motor to drive. The drilling capacity is ¼ to ⅝ in. and the tapping capacity from ¼ to ½ in. The No. 2 head requires either a 2- or 3-hp. motor and handles drills from ⅜ to 1⅛ in. and taps from ½ to 1 inch.

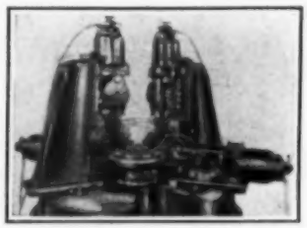
— 26 —

Drilling Machine, Nut and Screw-Head, Semi-Automatic

Kingsbury Machine Co., Keene, N. H. [Vol.67,p.712]

The machine shown was designed to drill small holes in each facet, or flat, of capscrews or nuts so that they may be wired together in the assembled machine. A clearance hole is first drilled axially at the center of the capscrew head, so that the drills used in the cross-drilling operation will not be broken at the intersection.

The base of the machine is



circular, and at its center is a seven-position indexing turret in which are carried seven small vertically disposed spindles, each of which has a six-position indexing movement of its own.

At the top of the base of the machine is a circular shelf on which are mounted six of the drilling heads, four with spindles horizontal and two in an upright position. Each drilling head is entirely self-contained, and is electrically driven.

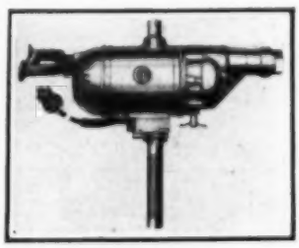
The machine occupies a floor space of about 5½ ft. square. It handles screws and nuts up to ⅜ in. in diameter.

— 27 —

Drill, Portable, Type UR, 2-Speed, ⅞-Inch

Cincinnati Electrical Tool Co., Cincinnati, Ohio. [Vol.67,p.211]

At its rated capacity, the tool operates at a normal speed of 380 r.p.m. A higher speed is also provided for smaller sized drills and shifts may be made



from one speed to the other while the motor is running.

Other features include the use of vanadium alloy steel gears and deep-groove radial ball-bearings, as well as a ball thrust bearing for end thrust. Lubrication is through grease held in the boxes by felt washers.

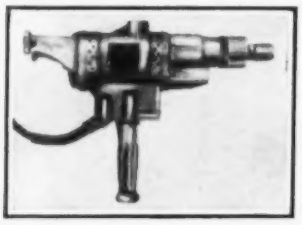
Square-type brush holders are used, fitted with so-called "pig tails" or shunts. The patented "Cincinnati" fully-inclosed switch is also used. The tool can be used on a.c. or d.c. circuits with 32, 110 or 220 volts.

— 28 —

Drill, Electric, High-Frequency, Thor

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. [Vol.67,p.331]

This company has brought out a line of electric tools with squirrel-cage motors for opera-



tion on 180-cycle current. The rotor has solid copper bars riveted and welded in position. The gears are made of special high-grade steel to withstand hard service.

One of the important features of this line of tools is the constant speed, from no load to peak load, with no appreciable slip. Another feature is the size and weight. It is about one-third that of a 60-cycle tool.

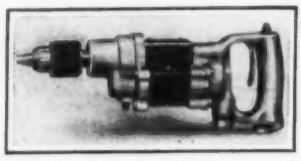
The Thor line of induction-type motor, 180-cycle electric tools includes drills, reamers, screw drivers, tappers, nut setters, grinders and sanders. The tool illustrated is a high-frequency drill having a weight of 24 lb. It is used for $\frac{1}{4}$-in. drilling and $\frac{1}{16}$-in. reaming and is also suitable for nut setting up to $\frac{3}{4}$ inch.

— 29 —

Drills, Portable, Air-Driven, High-Production

Rotor Air Tool Co., 5905 Carnegie Ave., Cleveland, Ohio. [Vol.67,p.370]

Three high-production air drills in capacities of $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. are announced. These drills embody a rotary air motor claimed to have unusual power



and to maintain its speed under load.

The motor has twin eccentric rotors mounted on the spindle, which runs in ball bearings. A special governor controls the speed.

The drills are designed to permit close corner work. The Jacobs chuck is furnished as standard equipment. Aluminum alloys have been used in the construction in order to keep the weight low. The $\frac{1}{2}$-in. drill weighs $7\frac{1}{4}$ lb. and the $\frac{3}{8}$-in. drill, $6\frac{1}{2}$ pounds.

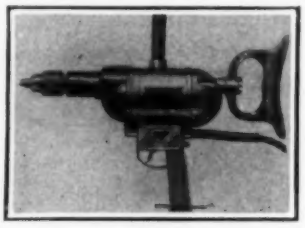
— 30 —

Drills, Electric, Portable

Millers Falls Co., Millers Falls, Mass. [Vol.67,p.602]

Two types of portable electric drills that will operate on either d.c., or single phase a.c. up to 60 cycles are being manufactured. Special features of these drills include heat-treated alloy steel gears, a ball thrust bearing on the spindle, ball-bearing motor shaft, and shunted brushes. The motors are inclosed in a ventilated aluminum housing and are equipped with an adjustable handle and breast plate.

The larger of the two drills, No. 612, employs a $\frac{1}{2}$-in. Jacobs chuck and has a capacity of $\frac{1}{2}$



in. in steel, and $\frac{3}{4}$ in. in hardwood. Its weight is 15 lb. The speed of the drill is about 300 r.p.m. at full load.

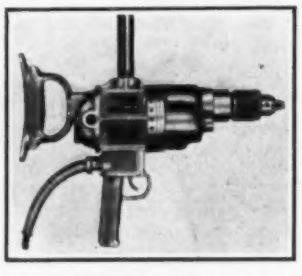
The smaller drill, No. 538, operates at a full load speed of approximately 600 r.p.m. Its weight is about 14 lb. It is equipped with a $\frac{3}{8}$-in. Jacobs chuck and has a capacity of $\frac{3}{8}$ in. in steel and $\frac{5}{8}$ in. in wood.

— 31 —

Electric Drill, Special, ½ Inch

Black & Decker Manufacturing Co., Towson, Md. [Vol. 67,p.955]

Several features of the $\frac{1}{2}$-in. special electric drill are stressed by the makers. It is light in weight, easy to handle and has ample power so that a man cannot stall it when drilling up to



its maximum capacity in steel. Its no-load spindle speed is 400 rev. per minute.

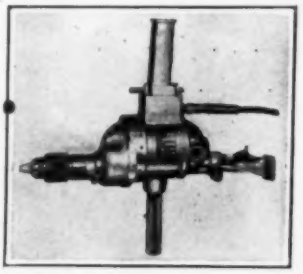
The drill is furnished complete with cable, attachment plug and a three-jawed geared chuck. The cable has three wires permitting one of them to be a ground connection.

— 32 —

Drill, Electric, Special, ½-Inch

Standard Electrical Tool Co., Cincinnati, Ohio. [Vol.67,p.791]

The special electric drill has a capacity for drilling holes up to $\frac{1}{2}$ in. in diam. in steel and



up to 1 in. hardwood. The motor used is made by the General Electric Co., and will operate on either d.c. or a.c. circuits of 60 cycles or less. It is an air-cooled type.

The gears are made of chrome-nickel steel, heat-treated. The shafts are mounted on SKF ball bearings. The housing of the motor is made entirely of aluminum and the complete weight of the drill is 14 pounds.

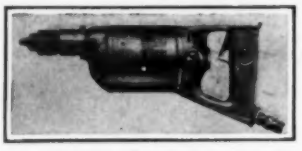
— 33 —

Electric Drills, Portable

Standard Electrical Tool Co., 1338 W. 8th St., Cincinnati, Ohio. [Vol.67,p.1039]

The line of portable electric drills is made in two types and five ranges of sizes. In Fig. 1, the $\frac{1}{16}$ in. size is shown. This is typical also of the $\frac{1}{4}$ in. size. Fig. 2 shows a typical unit of the range of $\frac{3}{4}$, $\frac{1}{2}$, and 1 in. heavy duty sizes.

The motors are of the universal type for use on either direct or alternating current. The gears are made of chrome-nickel steel and run in grease, while the shafts are mounted on SKF ball bearings. The



motor housings are made entirely of aluminum. The weights of the drills are $7\frac{3}{4}$, $8\frac{1}{4}$, 23, 24, and 24 lb., respectively.

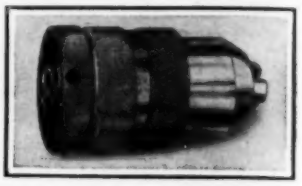
The $\frac{1}{4}$- and $\frac{1}{16}$-in. drills have a grip handle with a switch mounted therein. The three larger sizes are equipped with a Morse taper socket, spade handle, and a feed screw.

— 34 —

Drill Chuck, Keyless, "Ettco"

Eastern Tube & Tool Co., 594 Johnson Ave., Brooklyn, N. Y. [Vol.67,p.486]

An improved keyless, self-tightening drill chuck has been added to the line of products put out under the trade name "Ettco." After the chuck has been closed by hand it takes its own grip, and as the drill point goes deeper into the work, the grip becomes tighter. It is claimed that no matter how tight the grip becomes, the chuck can always be released by hand. Because of the absence of slippage, wear on the drill



shank and chuck jaws is reduced.

The chuck has been designed for use on electric or air drills and can also be used to advantage on flexible shaft units. The holding collar on top of the chuck is held by the operator to prevent the drill from turning when opening or closing the chuck.

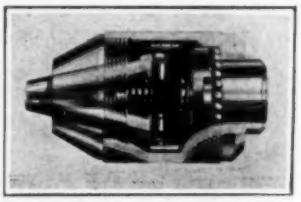
The chuck is furnished with any thread or taper to fit all standard makes of electric or air drills.

— 35 —

Drill Chuck, "Portomatic"

Jacobs Manufacturing Co., Hartford, Conn. [Vol.67,p.1030]

The "Portomatic" self-tightening chuck is for use on portable air- and electrically-driven drills. It is made in $\frac{1}{4}$, $\frac{5}{16}$-, $\frac{3}{8}$- and $\frac{1}{2}$-in. sizes and will



fit the new Jacobs standard tapers and threads.

All parts of the chuck are hardened and all parts except the screw and the nut or jaw-carrier are ground after hardening. The screw is made integral with the body, as is the wide flange that supports the lower ring of the ball bearing. The jaw-carrier is threaded to fit the screw, on which it moves freely.

The features of the chuck are its ability to grip tightly the drill without the use of a key.

— 36 —

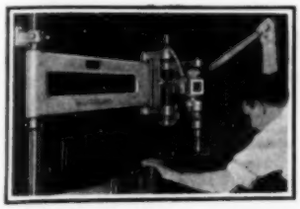
Radial Arm for Portable Electric Tools

Black & Decker Manufacturing Co., Towson, Md. [Vol. 66,p.37]

The radial arm is furnished with heavy brackets that bolt or clamp to a wall or post.

These brackets support a steel column carrying the arm. The arm has a vertical adjustment on the column of 24 in. and can be swung through an arc of 180 degrees.

The bracket is designed to take adapter blocks for any



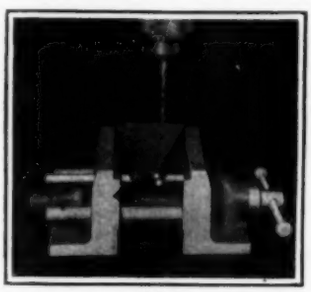
Black & Decker electric drill ranging in size from $\frac{3}{8}$ to $\frac{1}{2}$ in., inclusive, and Nos. 3, 4, and 41 electric screwdrivers or socket wrenches. The bracket has a vertical travel of $3\frac{1}{2}$ in. and is operated by a hand lever. It also has an angular adjustment of 245 degrees.

— 37 —

Vise, Drill Press, 4-Point

Demco, Inc., 195 S. Calvert St., Baltimore, Md. [Vol.67, p.175]

The vise is milled on all four sides, and the ledges in the jaws are parallel. The tops of the cross rods are in the same plane as the jaw ledges and are easily removed. The jaws are



made of semi-steel and the guide rods and screws of steel.

The vise holds the work at all times with three points of support and in many cases with four. There is no base to the vise and therefore no chance for chip clogging. The vise is made in two sizes: The No. 4 size has a jaw 4 in. wide, and an opening of 4 in., while the No. 8 size has an 8-in. jaw and an 8-in. opening.

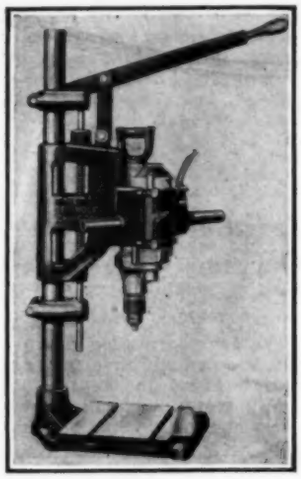
— 38 —

Drilling Stand

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.67,p.329]

The drilling stand shown can be supplied for post or wall mounting or in the conventional bench design. In Fig. 1 is shown the post drilling stand and in Fig. 2 is illustrated the bench model.

These drilling stands are made for all sizes of Hisey



electric drills from $\frac{1}{4}$- to $\frac{1}{2}$-in. capacity. They are designed so that the drills can be attached without removing any part of the machine. The supporting brackets and the electric drill housing are machined on each end to insure alignment of the drill in the stand.

— 39 —

Drill Jig

Siewek Tool & Die Co., 10232 Woodward Ave., Detroit, Mich. [Vol.67,p.405]

Cushion clamping is the chief feature of these drill jigs. The clamp is actuated by the crank handle, which rotates a crankpin. The pin engages the slot at the lower end of the post and imparts vertical motion to it.

A compression spring, which can be regulated to produce a pressure on the work ranging

from 5 to 400 lb., applies the actual pressure on the work. When the work is locked, the spring is under compression and the crankpin is on its lowest or dead-center position. At the point of clamping, therefore, little effort is required, because the mechanical advantage is greatest near dead center position.

The bushing plates are interchangeable so as to take care of a large number of different parts. The jig is made in four types, in both single and double column styles, with the anvil space ranging from 3 to 8 inches.

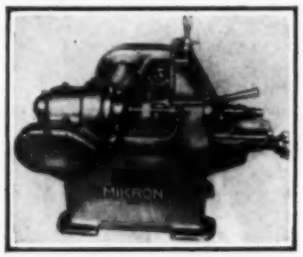
Gear Cutting and Testing Machines

— 40 —

Gear Hobber, Bench, "Mikron," No. 79

Triplex Machine Tool Co., 50 Church St., New York, N. Y. [Vol.67,p.525]

The "Mikron" No. 79 bench type gear and pinion hobbing machine is useful for hobbing brass and steel gear wheels and pinions up to $1\frac{1}{2}$ in. in diam.,



and up to $1\frac{1}{2}$ in. in length. The capacity of the machine allows gear wheels to be cut with 6 to 500 teeth. The blanks are held firmly on an arbor during the cutting operation so that slip is prevented.

The feed of the hob can be varied from 0.004 to 0.030 in. per rev. of the cutter. The hobs used with the machine are the backed-off type, so that they may be resharpened easily. Filtered fluid is supplied the cutters.

The machine is regularly furnished with countershaft, oil pump, reservoir and wrenches. Other tools, such as arbors, and a drawing spindle for spring chucks can be furnished.

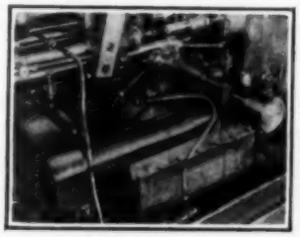
Floor space, 20x22 in.; weight 125 lb. net.

— 41 —

Worm-Generating Attachment for Cone Automatic

Cone Automatic Machine Co., Windsor, Vt. [Vol.67,p.718]

With this attachment, a worm of any size within the capacity of this company's automatic turning machine may be generated before the stock is cut from the bar. The hobbing is done in the third spindle position, and a worm is completed



at each indexing movement of the machine.

The attachment takes the place of the longitudinal slide at the rear of the machine. It consists of a slide, a master-screw that determines the pitch of the worm to be cut, and the cutter. The slide is advanced by a cam.

The master-screw revolves at a definite rate with relation to the machine spindle, and a wormwheel rolls upon the threads of this screw as upon the teeth of a rack as the slide advances. The rotation of the cutter and its rolling movement as the slide advances or recedes are independent of each other, and the rate of advance of the slide merely governs the depth of cut, of the amount of stock removed per revolution of the work.

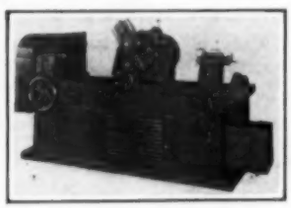
— 42 —

Gear Hobber and Thread Miller, No. 5

Adams Co., Dubuque, Iowa. [Vol.67,p.874]

Although designed primarily for the hobbing of spline shafts and the hobbing or milling of screws and worms, the No. 5 gear hobber and thread miller is also readily adaptable to the production of small spur and helical gears.

Power is derived from an electric motor in the base, and is easily accessible. The drive



includes a multiple-disk clutch with a sliding gear transmission providing eight cutter spindle speeds varying from 70 to 350 r.p.m. The pick-off gears give 39 standard feeds.

A balanced head drive is used to impart smooth power to the cutter spindle. This drive is mounted on double row ball bearings and ample capacity. All controls are centralized for convenience. Heat-treated alloy steel gears are used throughout with the exception of the pick-off gears. Particular attention has been paid to the lubrication of the machine.

The machine will accommodate work up to 10 in. in diam., and 48 in. between centers. It will take work 3 in. in diam. through the power spindle. A special head stock can be obtained for 5-in. bar work.

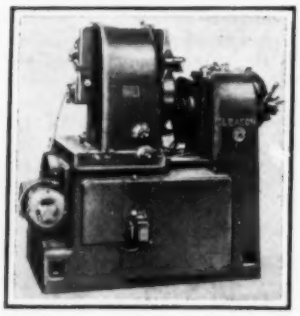
— 43 —

Generator, Spiral Bevel, Manufacturing 10-Inch

Gleason Works, Rochester, N. Y. [Vol.67,p.517]

Spiral bevel gears up to 10-in. pitch diameter can now be cut on a production basis with this machine, which has been designed as a single-purpose machine with as simple construction as possible.

The design is a radical departure from the previous spiral generators, but the same basic principle of generating is used. The generating motion is



obtained by means of a crown gear and segment. The spindle carrying the cutter is mounted on ball bearings, a feature peculiar to this machine.

Another important feature is the use of three motors, one for the cutter drive, another for producing the feed and generating motion, and the third for the index.

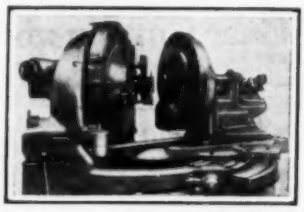
The machine is designed so that one of two work-carrying heads may be supplied: One of them is for gears of greater pitch angles than 63 deg. 26 min. and the other is for pinions of pitch angles less than 26 deg. 34 minutes. Standard equipment includes a segment for one gear or one pinion. The machine occupies a space of 5 ft. 7 in. by 3 ft. 10 in. and can be arranged in battery formation by using spacers to join the units together. Automatic lubrication is featured as well as means for collecting and removing the chips.

— 44 —

Gear Generator, Spiral Bevel, 60-Inch

Gleason Works, Rochester, N. Y. [Vol.67,p.390]

A new type of machine has been developed for generating large spiral bevel gears with a single planing tool. It has a capacity for gears up to 60 in. in diam. with a 10 to 1 ratio and up to 42 in. in diam. with a 1 to 1 ratio. The spiral angle can be varied from 0 to 30 deg. Index change gears are provided for numbers of teeth from



12 to 180, not including prime numbers above 100. The machine is practically universal within its range, except for slight limitations between spiral angle and cone distance due to required clearances.

The same accurate generating principle is used as in the smaller Gleason straight bevel gear and spiral bevel gear generators. The tool is carried on a cradle which rotates very slowly. The tool slide is reciprocated by a crank mechanism, while the gear blank rotates at a uniform rate. During one revolution of the blank the tool makes as many strokes as there are number of teeth and these motions continue until the operation is completed. In addition, the cradle on which the tool slide is carried is given a slight rocking motion to obtain the desired lengthwise curvature across the gear face.

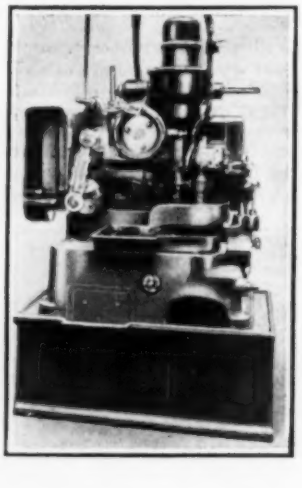
— 45 —

Gear Shaper, High-Speed, No. 7A, With 2-Inch Stroke

Fellows Gear Shaper Co., Springfield, Vt. [Vol.67,p.519]

A high-speed gear shaper having a 2-in. stroke and designed for cutting gears up to and including 5/7 diametral pitch has been developed. The machine has a hollow-type cutter-spindle made in one piece, which is well supported in the saddle and is arranged to carry a 4-in. pitch diameter cutter only.

The entire driving mechanism of the machine has been strengthened, and the driving pulleys are larger than those used on the regular No. 7 type gear shaper. A new apron has



also been added. In addition to the advantages of a longer stroke, this machine is better adapted to heavy-duty work, and will cut gears up to 2-in. face, 7-in. pitch diameter.

— 46 —

Gear Burnishing Machine

Cincinnati Shaper Co., Cincinnati, Ohio. [Vol.67,p.392]

The gear burnishing machine was designed with five points in mind: First, to secure constant pressure; second, to provide a definite time of burnish-

ing; third, to reverse the operations without removing the gear; fourth, to provide quick loading and unloading facilities; and fifth, to incorporate such mechanical refinements as ball bearings and automatic oiling. The machine is entirely automatic.

The operator places the gears in position between the master gears and brings the gear into engagement with the driving burnishing gear. The machine is first driven in a forward direction, and after a predetermined number of revolutions, the spindle is reversed.

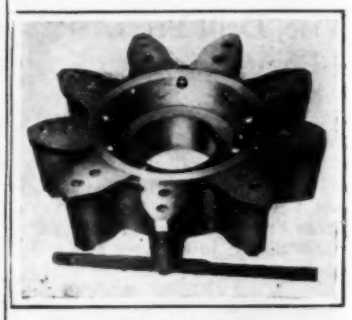
The machine requires three arbors and three master gears, one driving and two driven, all being furnished on request. A 3-hp. motor having a speed of 1,725 r.p.m. is required for driving.

— 47 —

Gear Cutters, Large-Size

Farrel Foundry & Machine Co., Buffalo, N. Y. [Vol.67,p. 489]

In order to obviate the difficulty of producing a completely hardened steel cutter of large size, a line of built-up cutters was developed. The one shown in the illustration is a pinion-type gear cutter and is typical of the construction used. The bodies are made of cast or forged steel and high-speed steel blades are securely held in position by wedges and bolts.



The cutting blades are roughed out to approximate tooth shape, are hardened, and are finished ground in position on the body.

The high-speed steel blades are comparatively small and therefore easy to harden thoroughly and evenly, and if one or more teeth are injured, it is a simple matter to replace them with new blades. All cutters or teeth from 1¾ D.P. upwards are of this inserted-tooth type.

Grinding Machines

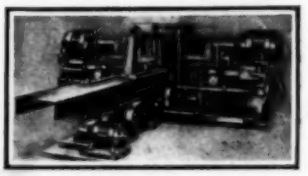
— 48 —

Grinder, Face, Double-Spindle, With Extra-Long Table

Badger Tool Co., Beloit, Wis. [Vol.67,p.214]

The No. 224 double-spindle face grinder is provided with an extra-long table, which is mounted on fourteen roller bearing rolls and four slide rolls. These rolls are mounted on eccentric studs so that alignment can be secured.

The table is driven by a separate 5-hp. motor through a bull-gear and rack. By change gears, various speeds up to 25



ft. per min. can be obtained. The length of table is 11 ft., and the width 18 in. The travel is 72 inches.

The main spindles are mounted on ball bearings, and each spindle is connected to a 20-hp. motor. The cylinder wheels are 24 in. in diam. and the maximum opening between wheels is 24 inch.

The particular machine was designed to grind cast-iron

boiler sections. After being clamped in the fixture the piece passes between the wheels, which are automatically fed up to micrometer stops.

Floor space 16x24 ft.; weight 24,000 lb. net.

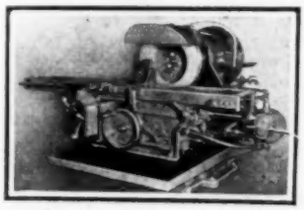
— 49 —

Grinder, Face, No. 8

Badger Tool Co., Beloit, Wis. [Vol.67,p.383]

The No. 8 face grinding machine is equipped with a hydraulically-operated table. The machine is of the built-in type motor drive, a 15-hp. motor being used.

The grinding table consists of a compound slide fitted directly



to the knee on the base casting, and a reciprocating table top fitted to the top of the compound slide. A cylinder and piston is fastened within the compound slide and the piston rod is connected to the rear end of the table top. The oil pump is driven by a silent chain through a separate 1-hp. motor. Adjustable stop dogs may be set for any stroke ranging from 1 to 32-in. in length.

The travel of the table can be changed at will. This adjustment can be made in any position of the table even while grinding is in process so that air gaps can be jumped.

The face grinding table has no vertical adjustment. Work holding fixtures are built at the proper height to bring the center of the work to be ground up to the center of the grinding wheel. Auxiliary table tops of different heights can be furnished, however.

— 50 —

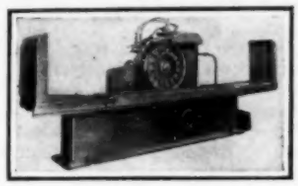
Grinder, Face, with Oil-Driven Table

Diamond Machine Co., Providence, R. I. [Vol.67,p.407]

The face grinding machine has a capacity for workpieces 84 in. long by 24 in. high. It swings a 30-in. segmental wheel upon a spindle that is rotated at a speed of 375 r.p.m. by a 40-hp. ball-bearing motor driving through a silent chain. The spindle runs in plain bronze bearings.

The work table of this machine is 152 in. long by 24 in. wide, of which a working surface of 84x24 in. is machined and provided with five T-slots.

A 5-hp. motor located in the base drives a variable-delivery



pump, oil from which is passed through a hydraulic motor. Oil delivery may be varied from zero to the maximum capacity of the pump, which imparts a table speed of 72 ft. per min. The hydraulic motor drives the table through a train of gearing, bull-wheel and rack.

The grinding wheel head has a cross movement of 3½ in. at right angle to the table travel. Automatic feeds are provided, or the feed may be by hand.

A separate tank, with baffle-plates and a settling basin, is provided to hold the coolant. The circulating pump is independently driven.

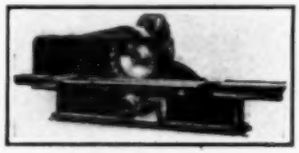
Floor space, 27 ft. 5 in. by 7 ft. 10 in.; weight 16,000 lb., approximately, with all motors.

— 51 —

Grinder, Face, Heavy-Duty, Type 94

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. [Vol.67,p.518]

Many improved features to facilitate easy and fast operation are incorporated in the Type 94 heavy-duty face grinder. The chief feature is the wide



range of table speeds made available by the hydraulic drive. Other features are the automatically-lubricated ball-bearing spindle, the convenient spindle brake and treadle control of the carriage reversal. Special attention has been given to rigidity under heavy loads.

The machine handles work up to 86 in. in length and 33 in. in height. The grinding wheel is a sectional wheel 42 in. in diam. having eighteen sections of 4-in. face and 8-in. depth.

With the hydraulic feed of the table, any speed of travel ranging from 0 to 85 ft. per min. is available. Automatic feed of the wheel head is also accomplished hydraulically.

The drive to the machine is by motor through a silent chain. Either a 60- or 70-hp. a.c. motor or a 60-hp. d.c. motor may be used.

High pressure lubrication is used wherever necessary. Coolant is pumped from a 2-stage tank in the base.

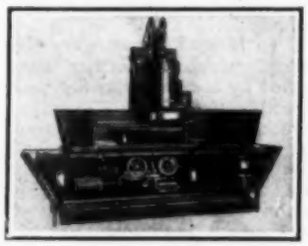
Floor space, 27 ft. 10 in. by 19 ft. 6 in., weight, 23,000 lb., approximately.

— 52 —

Grinder, Surface, Vertical, Precision

L. Sichel, Room 740, 200 Fifth Ave., New York, N. Y. [Vol.67,p.213]

The precision-type vertical surface grinder is of foreign design. It consists of a bed, table, upright column and a direct motorized grinding head mounted on a slide. The unit is assembled on a common bed-plate with means for accurate alignment of the bed. It is made in varying widths and lengths, as



well as grinding heights. The greatest width covered by the segment wheel is 25 inches.

The bed of such length that table overhang is eliminated. The ways of the bed are accurately ground. The table can be reciprocated at various speeds and its stroke is adjustable. Either hand feed or power feed is available.

The motor armature is mounted integral with the spindle, which is carried on ball and roller bearings of special design. It is said that the machine is accurate to 0.0003 in. over its entire working length.

Automatic lubrication is furnished as well as a water tank, pump and piping for wet grinding. The bed ways are protected by a cover which automatically unfolds and rolls up as the table advances and retreats.

— 53 —

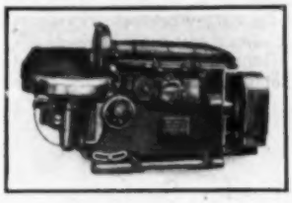
Grinder, Surface, Rotary, No. 25-A

Heald Machine Co., Worcester, Mass. [Vol.67,p.330]

The No. 25-A improved model rotary surface grinder is intended for rapid production of large size work. In general it is a development of the earlier machine of the same type, but is equipped with the Heald hydraulic drive, by which the ram may be reciprocated at any desired rate of speed up to and including 50 ft. per minute.

The main motor, of 15 hp., is attached directly to the rear of the base and drives the wheel spindle, the oil pressure pump of the hydraulic drive and a circulating pump to deliver coolant to the work.

The ram travels on flat and V-ways and its reciprocation is



controlled by adjustable valves. The vertical slide is carried on a swiveling bracket on the front of the base, having angular adjustment in a vertical plane up to 15 deg. to grind work convex or concave.

The vertical adjustment of the chuck can be obtained by hand or automatically by power. The chuck spindle is driven by an independent variable-speed motor and runs in radial ball bearings at the top and a plain bronze sleeve bearing at the bottom.

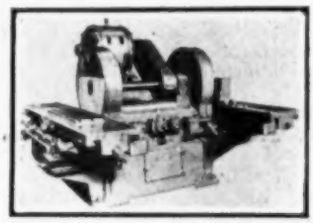
The machine is available in three sizes with 16-, 24- and 30-in. chucks, swinging work, 20, 29 and 36 in. in diam. respectively. Floor spaces occupied are 105x66, 107x66 and 117x66 in., while the net weights are approximately 5,500, 6,500 and 7,000 lb. respectively.

— 54 —

Grinder, Surface, Hydraulic, No. 89

Gardner Machine Co., Beloit, Wis. [Vol.67,p.412]

This hydraulically-operated No. 89 surface grinder is particularly adapted to the handling of pieces having two or more surfaces to be ground, but which are in such relation to each other that they cannot be



efficiently finished simultaneously. The machine is semi-automatic in operation.

It has two hydraulically-actuated work tables and one head supporting two abrasive cutting members. One operator can serve both tables, or they can be operated either simultaneously or alternately. If required, the tables can be so fixed that two operators can be employed without any interference with each other. Both work tables are controlled by one lever.

The abrasive members are carried on opposite ends of the spindle which is mounted on ball bearings. The spindle is driven either by belt or by silent chain from the motor, a 25-hp. motor being recommended.

The abrasive members consist

of either 30-in. disk wheels or 24-in. ring-wheel chucks carrying abrasive ring wheels.

Floor space 9x10½ ft.; weight 10,500 lb. approximately.

— 55 —

Grinder, Surface, No. 4

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.67, p.400]

In the No. 4 surface grinder the table is reciprocated by an Oilgear hydraulic feed, and a complete range of speeds from 0 to 55 ft. per min. is available by simply turning a handle in the front of the base. The same

Oilgear drive is also connected to an adjustable cross-feed engine, which may be set to feed either in or out.

The base is a heavy casting and it stands on a three-point bearing to insure freedom from strain.

The head carries an extra-heavy steel spindle, mounted in adjustable bronze bearings. The elevating screw is centralized between the ways. The wheel head is raised or lowered by a handwheel provided with a vernier scale and backgears for fine adjustment.

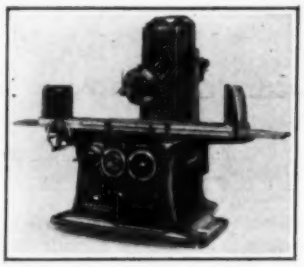
The standard spindle construction is arranged for mounting wheels 10 in. in diam. by ¾ or 1 in. face. The machine is offered for dry grinding or for wet grinding including pump, tank, convenient splash guards and piping. A specially-designed magnetic chuck with a working surface of 10x24 in. is also available.

— 56 —

Grinder, Surface, No. 5

Abrasive Machine Tool Co., Providence, R. I. [Vol.67,p.715]

This improved surface grinding machine was developed for the particular purpose of finishing large dies and similar work with precision on a production basis. The unit is entirely self-contained, having the driving motor in the cabinet base. If desired, a small d.c. generator can be included in the



equipment to furnish current for magnetic chucks.

The table movements are derived through a gear box within which is incorporated a hydraulic cushioning device to absorb the shock of reversal. The table travels at the rate of 25 ft. per minute.

Two large V-ways carry the saddle, which is further supported by a substantial flat way directly under the grinding wheel. Vertical adjustment of the grinding head is obtained through a handwheel or by power for rapid traverse. A handwheel is also used to travel the table longitudinally, but power may be applied to traverse the table and to elevate or lower the grinding head rapidly, or to feed the saddle in either direction. The traverse of the table is automatically reversed at any point by the usual table dogs.

The machine is built in two sizes having longitudinal table travel of 40 and 48 in., respectively. Grinding wheels up to 14 in. diameter by 1½ in. face may be used.

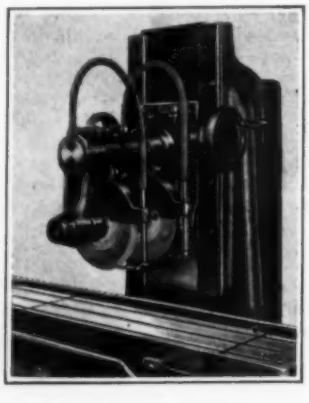
Floor space 169x72 in.; weight 7,200 lb. approximately without driving motor.

— 57 —

Grinder, Surface, With Duplex Wheelhead, "Abrasive"

Abrasive Machine Co., Providence, R. I. [Vol.67,p.790]

The special duplex grinding head with extra-long wheel spindle and an overarm support for the outboard end was designed for use in connection with this company's regular No. 3 surface grinding machine. No change in the machine is necessary other than to remove the



standard head and substitute the special one.

The overarm is a round steel bar screwed permanently to the main casting of the grinding head. An adjustable swinging arm carries the bronze sleeve bearing to support the outer end of the wheel spindle.

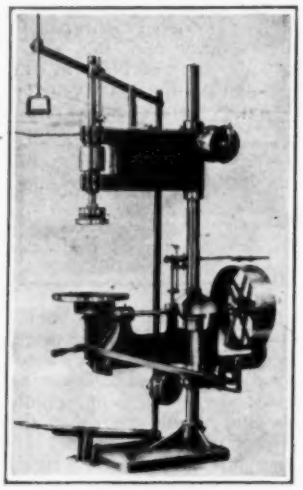
The spindle swings wheels up to 8 in. in diam., and its length permits a maximum spacing between wheels of 6 in. The wheels are carried upon separate sleeves. The wheel guards are adjustable along the bar to accommodate different positions of the wheels. Each guard is made in two parts, and is hinged above the overarm, so that the guards may be swung out of the way without removing them entirely from the machine.

— 58 —

Grinder and Polisher, Surface, Vertical, No. 725

Defiance Machine Works, Defiance, Ohio. [Vol.67,p.882]

Flat surfaces such as the center of steering wheel spiders, and similar work can be ground or polished on this machine. It can also be used as a wood boring machine to bore out the cen-



ter holes in automobile wheels and to drill flange bolt holes.

The revolving table is mounted on a swinging arm that can be adjusted off center. It is power driven at a speed to suit requirements. The spindle travels through a splined sleeve and has 8 in. of vertical adjustment. The maximum distance from the nose of the spindle to the top of the table is 14 in. The distance from the center of the spindle to the face of the column is 22 in.

The spindle can be fitted with disks up to 10 in. in diameter, or with an expanding chuck to hold a cup grinding wheel. Spindles can also be fitted with a universal chuck to carry boring bits with ½-in. shanks or smaller.

The machine is regularly furnished with a separate countershaft complete with a belt shifting device. It requires a 3-hp. motor to drive.

Floor space 58x30 in.; weight 1,000 lb. net.

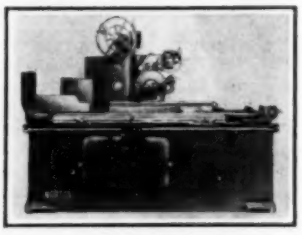
— 59 —

Grinding Machine, Surface, Hydraulic, 6x10x36-Inch

Norton Co., Worcester, Mass. [Vol.67,p.993]

Radical improvements have been made on the open-side surface grinding machine. The principal features are the hydraulic table traverse and the two lengths of tables in which the machine is furnished. The base is longer and is designed to carry two lengths of table, one provided for grinding work up to 36 in. and the other up to 48 in. in length.

The hydraulic mechanism for traversing the table is entirely inclosed within the base. All



movements of the table are controlled by two levers in conjunction with table dogs. The table speeds can be varied from 30 to 90 ft. per min., and air cushions are used with the hydraulic system to allow smooth reversal at high speeds.

Many features of the old machine are retained in this model, including the flood-lubricated grinding wheel spindle with adjustable bearings. The cross feed of the wheel slide is by means of two handwheels, one for regular operation and the other for slow motion while truing. Splash guards running the entire length of the table are provided.

A standard 15-hp. constant-speed motor furnishes power for both the spindle and hydraulic table traverse. The standard grinding wheel used is 10x3 inches.

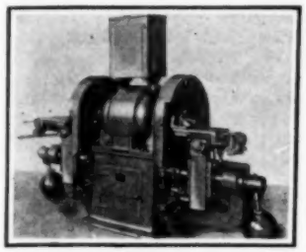
The projected floor space occupied by the two models is 12 and 13 ft., respectively, by 64 in. deep. The weights are 7,300 and 7,400 lb.

— 60 —

Grinder, Disk, Dry, No. 161

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.67,p.676]

The machine features direct-connected motor drive with power-operated oscillating tables



having both geared-lever and oil feed.

The oil cylinder is attached to the back of the table guide and operates directly on the top.

The oil is supplied through piping and flexible metal hose direct from a rotary pressure pump. The table is attached to a heavy vertical bar which is adjustable up and down in a dovetail guide in the rocker box. The rocker shafts are equipped with Timken roller bearings mounted on rigid outboard supports.

The grinding disk is driven by a 30-hp. motor, controlled through a push-button switch. The grinding wheel is mounted directly on the motor spindle, which is carried in Timken roller bearings.

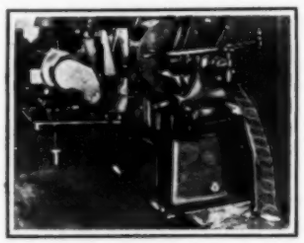
The power oscillating and Oilgear unit is driven by a ½-hp. motor and is also controlled by a push-button switch.

— 61 —

Grinder, Disk, No. 6, With Semi-Automatic Feed

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.67,p.681]

The semi-automatic feeding fixture for rough grinding the sides of individual cast piston rings from the smallest up to and including rings 5 in. in diam. was recently applied to



the No. 6, 20-in., dry disk grinder. A production of 40 to 100 rings per min. is claimed, depending on the amount of stock removed and the surface area of the rings being ground.

The machine uses steel disk wheels set up with No. 36 PRS Besly Titan Abrasive disks.

The operator places the rings in the feeding trough and the weight of the pile forces them against the rotary feed disk, which picks off a ring and carries it to the pressure feed roll. These rolls force the ring, with the aid of guides, between the grinding disks.

— 62 —

Grinders, Disk, Vertical-Spindle, No. 309

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.67,p.716]

Two small sizes have been added to the No. 309 line of vertical spindle, motor-driven disk grinders made by this company. Heretofore the smallest size was 40 in. The illustration shows the 30-in. size, but the model is also made in an 18-in. size. The machines can be used in conjunction with semi-automatic fixtures, as used on the larger machines. They can

also be used wet, a pump being provided.

A wheel dresser is attached on the crossbar to assure a square-faced abrasive at all times. Additional work-holding bars can be installed so that several pieces can be ground at once.

The 30-in. model is driven by a 10-hp., a.c. motor, at 860 r.p.m. The disk is 33 in. from the floor. The weight of the unit is 1,565 lb. net. The 18-in. grinder is driven by a 5-hp. motor at 1,800 r.p.m. The domestic shipping weight is 800 lb. net.

— 63 —

Grinder, Disk, Horizontal, Type D-3, Improved

Porter-Cable Machine Co., Syracuse, N. Y. [Vol.67,p.957]

Some improvements were made in the Type D-3 disk grinder. The base mounting has been changed so that the column is centered instead of offset. The motor, which is built in as part of the column, is controlled by a 2-pole push-button switch located on the motor.

The solid iron disk, carefully balanced, is supported by an over-size thrust bearing. This

disk is 15 in. in diam., and is 39 in. from the floor. An extra metal disk is provided, together with six abrasive disks The motor is rated at ½ hp., and rotates at 1,725 rev. per minute.

The patented dust collector system is still used, but the collecting bag is attached directly to the machine.

Floor space is 22x39 in.; weight, 180 lb. net.

— 64 —

Grinder, Cylindrical, Type BA, 14-Inch

Norton Co., Worcester, Mass. [Vol.67,p.363]

The heavy-duty Type BA cylindrical grinding machine has a swing of 14 in. and provision for a wheel width of 15 in., so that it broadens considerably the field for straight-in grinding.

The machine is of the same principle as the Norton Type

BA construction, including all the features of the 10-in. Type B grinding wheel unit. All dimensions, however, have been increased to provide larger bearing areas and strength ample for the requirements of the heavier wheel and work. The machine is made in lengths to accommodate all work of the class for which it is adapted.

The machine is driven by a 30-hp. motor mounted in the base.

The power wheel feed is arranged for 20 in-feed speeds through a wide range. Compensation for wheel wear can be easily made. A wheel spindle reciprocating attachment can be applied for moving the wheel back and forth in the direction of its axis.

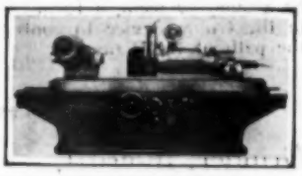
Power table traverse is provided for truing the wheel. Variable work speeds are available through the use of an adjustable speed headstock motor. The weight of the machine in a 24-in. length without motors is approximately 7,800 lb. and with motors about 13,300 pounds.

— 65 —

Grinder, Hydraulic, Plain Type

Landis Tool Co., Waynesboro, Pa. [Vol.67,p.393]

In addition to the features of the earlier hydraulic grinders made by this company, several additional improvements are noted on this machine, the capacity of which is 10x52 in. It is equipped with a hydraulic power traverse to the table and



a hydraulic infeed to the wheel head.

A variable-flow oil pump and a continuous hydraulic motor furnishes the power for traversing the carriage, with a speed range from 12 to 300 in. per min. This pump furnishes only the amount of oil required for any traverse speed.

The headstock is driven from a variable-speed motor mounted on the headstock casting. The drive to the face-plate is by Texrope to a worm and wheel.

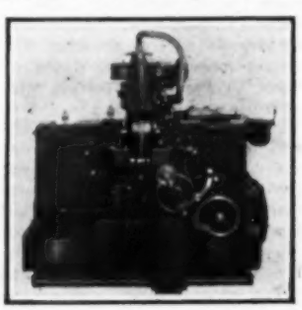
The wheelhead is carried on flat and V bearings. The wheel spindle is mounted in adjustable bronze bearings, automatically lubricated, and is driven through a Texrope drive from a constant-speed motor.

— 66 —

Grinder, Cylindrical, Full-Automatic

Norton Co., Worcester, Mass. [Vol.67,p.382]

To meet the demand for high production of small parts and to secure the accuracy and finish



desired, the full automatic grinding machine was designed. The automatic control results in the production of highly uniform products with long wheel life and a low idle-time factor. The machine has a capacity for work up to 4 in. in diam. and to 5 in. long. The work is located on centers.

The regular Norton 10-in. type D grinding wheel unit is used, embodying self-contained motor drive. The wheel feed is linked with the automatic controls and timed with the operating cycle. Positive gear drive and hand action control the cycle of operation from the automatic loading of the work on the live centers to its ejection when finished The work revolution and rate of infeed of the wheel are timed to suit the conditions of each individual job.

The wheel truing device is in the wheel guard and has power traverse. Formed surfaces may be ground by using a form bar in the truing device to control the path of the diamond.

— 67 —

Grinder, Internal, Duplex Size-Matic

Heald Machine Co., Worcester, Mass. [Vol.67,p.289]

In this machine concentric holes of the same size may be ground in opposite ends of a single work-piece simultaneously. The application of the automatic sizing features of the Size-Matic machine to two

holes instead of one is accomplished by transferring the sizing mechanism from the wheel-slide to the work-head, which is mounted on a cross-slide midway of the machine. The wheel-slides reciprocate, but have no crosswise adjustment.

The work-carrying spindle is an annular shell having an internal diameter of 7½ in. Special fixtures are necessary to accommodate the work-piece within this diameter. The work-spindle is driven by belt from the main shaft, which also drives the oil pump that supplies power to operate the cycle movements of the machine, the coolant pump, and the d.c. generator to energize the magnetic controlling apparatus.

The cross-slide is provided with fine and coarse feeds, operated automatically. As the size of the holes being ground approaches the predetermined dimensions, the magnetic control causes the wheels to be withdrawn, the truing diamonds to swing down and dress the wheels, and the wheels to return to the work for a predetermined number of strokes before withdrawal. The machine may be set to produce holes within 0.0002 in. of exact diameter.

The operative force to reciprocate the wheel-slides is furnished by two hydraulic cylinders connected together by a floating rack and pinion.

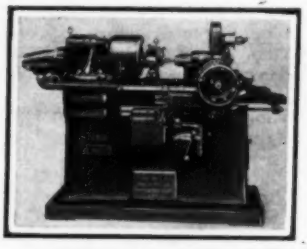
Floor space, 30¾x108 in.; weight, 8,500 lb. net.

— 68 —

Grinder, Internal, Style 72-A

Heald Machine Co., Worcester, Mass. [Vol.67,p.371]

An improved series of internal grinding machines made in the plain, semi-automatic and Size-Matic types, known as Style 72-A has been placed on



the market to replace the line of No. 72 machines. An additional model has been added, known as the No. 72-A-2, to handle work not over 2 in. in length. It has ways 55 in. long and occupies a floor space of 108x50 in. It can be furnished in either belt or full motor drive and in the Size-Matic style only. Many improvements have been incorporated in this small model that have been adapted to the entire line.

The principal working units such as the hydraulic drive for the table, the all-ball-bearing workhead, and automatic micrometer diamond, still remain with slight improvements. The base has been redesigned and the height reduced so that the spindle is now 44 in. from the floor.

The machines are equipped with a single-speed workhead drive on both the belt and motor driven machines. The wheel-head is driven from a long drum on the countershaft.

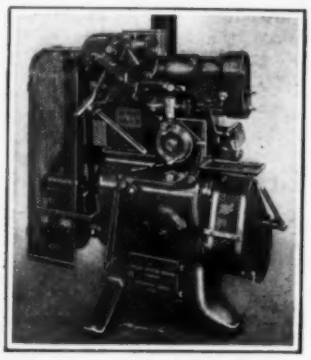
The slow down valve and diamond control has been simplified in construction. A guard covers the entire back.

— 69 —

Grinder, Hole, Semi-Automatic, No. 3

Bryant Chucking Grinder Co., Springfield, Vt. [Vol.67,p.374]

In order to provide for the rapid production of holes up to 1¼ in. in diam. and 2 in. in



length in ball bearing races, small gears, bushings and the like, the No. 3 semi-automatic hole grinder was developed. The swing of the machine is for work 6½ in. in diameter. It can be furnished for direct drive from a single motor at the rear, or by belt.

This company's standard suspended wheel slide is incorporated in the design, in order to insure rigid and accurate control of the wheel.

Among other improvements added to the unit are the diamond holder, simplified air valve, larger wheelhead and miscellaneous refinements intended to simplify operation.

— 70 —

Grinder, Hole, Chucking, No. 12

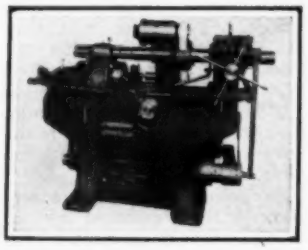
Bryant Chucking Grinder Co., Springfield, Vt. [Vol.67,p.482]

In order to supplement the smaller No. 3 grinder, the No. 12 semi-automatic hole grinder was developed. It has a 12-in. swing and an 8-in. grinding stroke and is entirely self-contained. It is particularly effective on holes 1 in. in diam. and larger.

The same suspended wheel slide construction used on other machines made by this company is retained in this model.

The wheel spindle is driven by belt from a 4-hp. motor mounted on the wheel slide. A second motor, rated at 2 hp., is mounted on the back of the machine and drives the work spindle, longitudinal traverse, power feed and pump. Two work speeds 200 and 400 r.p.m. are available. The slide automatically swings to the rear, giving access to the chuck. Power feed is accomplished by a cam on the traverse shaft and is adjustable.

An automatic clutch starts



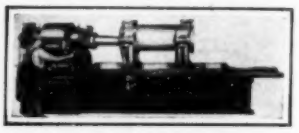
and stops the work as the wheel enters and leaves. Provision is made for the use of a sizing device and a wide variety of quick acting chucks are available and are interchangeable with earlier machines made by this company.

— 71 —

Grinder, Internal, Heavy-Duty

Micro Machine Co., Bettendorf, Iowa. [Vol.67,p.394]

This heavy-duty internal grinding machine has a capacity for grinding holes from 5 to 36 in. in diam. by 60 in. deep. An indication of the machine's



size and strength is given by the fact that the main bearing is 48 in. in length and 14 in. in diam. The total eccentric throw of the grinding spindle is 4 in. but this dimension may be increased to 10 in. with a special double-throw eccentric.

The size of the main table is 114x30 in. and the usual T-slots are provided. The total table travel is 62 in. The main table is driven hydraulically and a wide range of table feeds are available, including rapid traverse.

A variable speed drive is embodied in the machine for regulating the main cylinder speed to suit the diameter of the hole to be ground. A constant speed is supplied to the grinding wheel, however, through the Micro pantograph spindle drive.

All slide ways are protected from dust and all revolving shafts are mounted upon ball bearings. A 15-hp. motor is required for driving.

Floor space, 6x22 ft.; approximate weight, 25,000 lb. net.

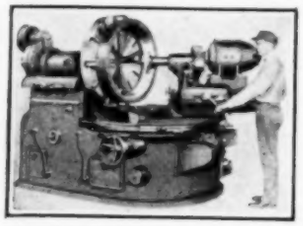
— 72 —

Grinder, Internal Radius, Model IG, for Special Dies

Micro Machine Co., Bettendorf, Iowa. [Vol.67,p.793]

Radii on drawing dies can be ground in the Model IG internal radius grinder shown. The range of the grinder permits radii from 1 to 10 in. to be ground in holes varying from 10 to 25 in. in diameter, and up to 6 in. in depth.

The grinding head and driving motor for the spindle are mounted on a circular table which can be rotated 65 deg. The table pivots on a pin and



is driven through a segment gear. The table has both hand and rapid power feed in addition to five feeds.

The chuck headstock spindle is mounted on taper roller bearings. The whole headstock unit is carried on an intermediate slide to obtain adjustment for various radii.

The grinding spindle is mounted on ball bearings and is balanced. Longitudinal and transverse feed movement is provided by an intermediate slide.

A 3 hp. motor is required to drive the grinding wheel spindle. The headstock drive motor is rated at 2 hp. and another 2 hp. motor is required to drive the exhaust fan.

Floor space, 12x8 ft.; height, 6 ft.; weight, 12,700 lb. net.

— 73 —

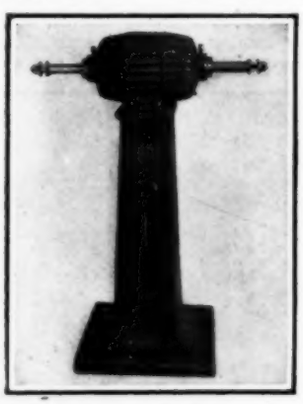
Grinders and Buffers, Motor-Driven

J. G. Blount Co., Everett, Mass. [Vol.67,p.400 and 559, *Erratum*]

The motor used in these buffers and polishers has been especially designed for this class of service, and, by bettering its power factor, lower current consumption is obtained for the same output. At the same time the heating of the motor has been reduced to a minimum.

Much larger spindles are used and the spindle ball bearings have also been increased in size. They are of the heavy-duty, deep-groove type.

The motor frame and end-shield are of corrugated type to dissipate the heat. The improved line comprises motor grinders, buffers and combination grinders and buffers, both floor and bench types from ½ to 7½ hp. capacity in a.c. types only.

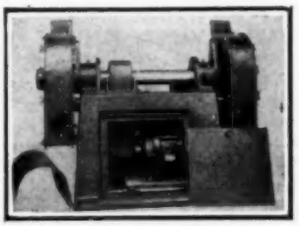


— 74 —

Grinder Stand, Type HS

Ransom Manufacturing Co., Oshkosh, Wis. [Vol. 67,p.524]

A line of grinding machines, known as Type HS, incorporating direct electric drive from a.c. motors, was designed with the rigidity to operate at any wheel speed up to 11,000 ft. per min. The base has a large floor



area to give it stability, but the frame is so designed as to be out of the way of the workman.

The spindles are large and are mounted on SKF ball bearings, amply protected.

The motor is bolted to an adjustable plate in the base. Any standard make of motor can be supplied. The desired spindle speeds are obtained by changing the pulley sizes

A feature of the line is the adjustable rests and rest brackets for use in apron grinding. The guards have a removable hopper at the front to allow the workman to stand close to the wheel.

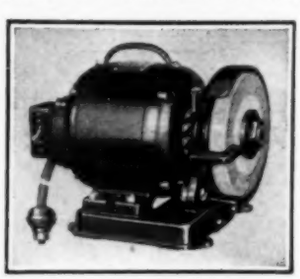
The No. 22 HS grinder is driven by a 7½-hp. motor and is for use with 14x3-in. wheels. The No. 43 HS machine is driven by a 10-hp. motor and is for use with 18x3-in wheels, while the Nos 64 and 74 HS machines are driven by 15-hp. motors. They carry 21x3-in. and 24x3-in. wheels, respectively.

— 75 —

Motor-Grinder

Master Electric Co., Linden and Master Aves, Dayton, Ohio. [Vol.67,p.752]

This motor grinder is intended especially for the small shop where the unit can be used



either as a grinder or as a power motor.

The power unit is a Master type SA ½-hp. split-phase motor and has self-aligning, phosphor-bronze bearings with splash-proof guards. A d.c. motor can also be supplied for operation on 32-, 115-, 230-volt lines.

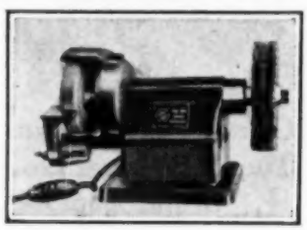
The adapter pulley holds the grinding wheel in place and also serves as a grooved pulley. The grinding wheel is 6 in. in diam. by ¾ in. thick and is supplied with a guard in conformance with safety regulations. The motor is mounted on a cast-iron base, which also supplies a support for the wheel guard. Attached to this wheel guard is an adjustable tool rest for both edge and face work.

— 76 —

Grinder and Buffer, Combination

Black & Decker Manufacturing Co., Towson, Md. [Vol.67, p.954]

The combination grinder is for sharpening all kinds of edge tools, buffing and cleaning. It has a speed of 2,400 r.p.m. The



universal driving motor is ball-bearing mounted.

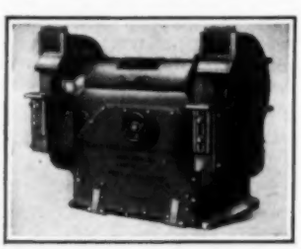
The grinder is furnished complete with a 5-in. grinding wheel on the left side of the spindle and a 6-in. wire wheel brush on the right side. Buffs may be interchanged with the wire brush. The equipment also includes 6 ft. of cable equipped with attachment plug and switch in the line, one tool rest and one wheel guard. The unit is furnished for use on 32-, 110-, 220-, or 250-volt circuits.

— 77 —

Grinder Stand, Type N, Heavy-Duty

Kling Bros. Engineering Works, 1500 N. Kostner Ave., Chicago, Ill. [Vol.67,p.958]

The type N heavy-duty grinder was formerly manufactured in limited quantities for C. E. McArthur & Co. of Chicago. Kling Bros. are now



offering the machine to the general trade.

The unit is heavily constructed throughout so as to take heavy cuts while maintaining fair commercial accuracy. A high peripheral speed of the wheels is maintained by means of a 3-step cone pulley which allows the belt to be shifted as the wheel wears down.

The unit is recommended for grinding gray iron, malleable and steel castings, iron and steel forgings, and parts of any materials. It is also useful for job work of snagging or rough grinding.

— 78 —

Grinder and Polisher, Portable, No. 63

Buckeye Portable Tool Co., Dayton, Ohio. [Vol.67,p.291]

This air-driven tool is for polishing and grinding the side rods of locomotives. It can also be used for all other flat sur-

faces. The tool is 27 in. long overall, 2½ in. in diameter, weighs 15 lbs. complete. The wheel rotates at 6,000 r.p.m. and polishes a surface 6 to 9 in. in width.

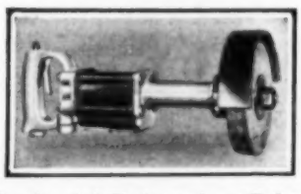
The tool operates on the rotary principle and has only four moving parts. The rotor is started in motion by a safety control valve in the handle, near where the air enters.

— 79 —

Grinder, Air-Driven, Model D-1, "High Production"

Rotor Air Tool Co., Cleveland, Ohio. [Vol.67,p.412]

The "High Production" Model D-1 air grinder was designed exclusively for the use of rub-



ber-bonded Redmanol or Bakelite wheels. The machine operates under load at 5,400 r.p.m., giving a peripheral speed of 8,500 ft. per min. The free speed without load is limited to 5,800 r.p.m. by a quick-acting governor.

The rotors of the air motor operate in a film of oil and do not touch the cylinder. The spindle is mounted upon ball bearings. The exhaust and inlet sides are sealed by a fiber blade

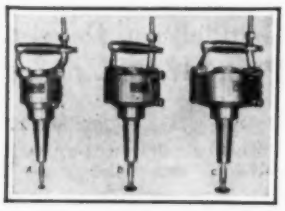
riding on the chrome-nickel steel rotor. This construction concentrates wear on the fiber blade which can be quickly replaced at low cost.

— 80 —

Grinders, Hand, Pneumatic

Onsrud Machine Works, Inc., 3900 Palmer St., Chicago, Ill. [Vol.67,p.673]

Small pneumatic hand grinders are being made in three sizes. At *A* is shown type E-3-C which operates at 28,000



r.p.m. and is suitable for wheels 1 in. in diam. It weighs 8 lb. Type H-3-C shown at *B* operates at 20,000 r.p.m. and is suitable for wheels 1½ in. in diam. Its weight is 9 lb. Type K-3-C shown at *C*, operates at 14,000 r.p.m. and is suitable for wheels 2 in. in diam. Its weight is 10 pounds.

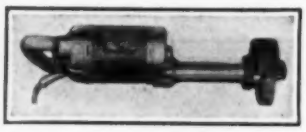
Each tool is suitable for operation on 90 to 100 lb. per sq.in. air pressure. The driving mechanism is a three-stage turbine carried on ball bearings. Ample power is provided so that the wheels maintain their speed under load.

— 81 —

Grinder and Buffer, Portable, "Hisey"

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.67,p.1031]

A ball-bearing motor and a roller bearing grinder spindle are featured in the ¼-hp. portable grinder and buffer.



The motor was designed especially for this service and is of the universal type. It will operate on either direct current or single-phase alternating current of either 110 or 220 volts. A wheel 5 in. in diam. x 3¾ in. face is used. The wheel guard is of cast steel and is adjustable to any angle. The end cover is readily removable and affords a quick means for renewing the grinding wheel.

The unit is supplied with 10 ft. of all-rubber cable and a suitable attachment plug. The net weight of the unit with steel guard is 23 lb. The overall length is 22 inches.

— 82 —

Automatic Switch for Portable Electric Grinder

Jas. Clark, Jr., Electric Co., Louisville, Ky. [Vol.67,p.74]

The automatic switch used with this company's electric drills has now been applied to its line of hand grinders. The

same hand that is used to guide and support the tool is also used to manipulate the switch so that as soon as the grip is released, the motor stops.

Three sizes of portable grinders are equipped with the automatic switch, Nos. 00, 0, and 1. These tools are used for removing burrs from castings, smoothing off welds, and the like.

— 83 —

Grinder, Cutter and Tool, Universal No. 1½, "Grand Rapids"

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.67, p.212]

The machine is designed so that the knee, saddle, subtable and table can be swung entirely around the column while the

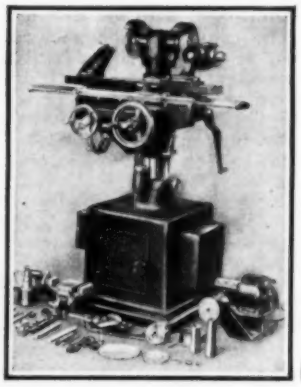


table swivels on the sub-table to 180 degrees.

Both vertical and cross movements are provided by means of screws, while longitudinal movement is provided by means of a rack and pinion. The machine is rigidly constructed throughout, as are the attachments. The headstock is of the universal type with swivel base graduated in degrees.

The machine can be furnished for either belt drive or self-contained motor drive, in which case the grinding wheel spindle is driven by a 1-hp. motor built into the base of the machine. The headstock is driven by an integral ¼-hp. motor.

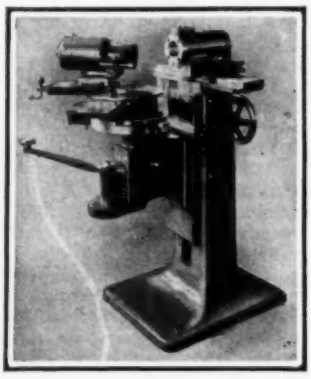
Listed among the specifications are: Size of table, 5x26 in.; longitudinal travel, 16 in.; traverse movement, 8 in.; vertical movement, 6¾ in.; maximum swing, 9½ x 20 in.; maximum diameter of face milling cutters, 12 in.; net weight, 786 lb.

— 84 —

Grinder, Face-Mill

Oliver Instrument Co., Adrian, Mich. [Vol.67,p.383]

This face-mill grinder is for grinding the face and periphery of the cutting blade at one setting. The grinder also forms a circular corner, joining the face and periphery, so that the entire cutting edge is smooth and continuous. The machine is also



adapted for grinding various other types of milling cutters and form tools, or for other grinding operations requiring a radial motion of the grinding wheel or a combination of straight and radial grinding.

The size of arc is governed by two cams, and the radius of curvature is determined by the distance of the grinding face of the wheel from the center of rotation. It is possible to grind a face mill with a different clearance on the periphery than that ground on the face, and this clearance will automatically change while the grinding wheel is forming the round corner.

The spindle is fitted with a standard spindle nose. Cutters up to 18 in. in diam. and 6 in. thickness can be ground.

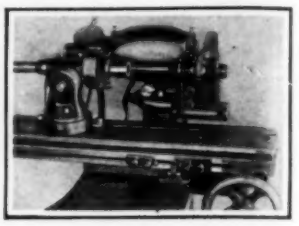
Weight, 1,000 lb.

— 85 —

Grinder, Cutter and Reamer, Universal No. 3

Greenfield Tap & Die Corporation, Greenfield, Mass. [Vol.67,p.404]

A standard universal cutter and reamer grinding machine has been equipped with an electrically-driven grinding head for use on circuits of any commercial voltage, phase, or frequency. The attachments that go with



the machine are the same as those supplied with the belt-driven machine of the same capacity.

The specifications for this machine are: vertical movement 8 in., cross-feed 6 in., length of table travel 19 in., length of piece that can be held between centers 21 in., and swing over the table 6¼ in. The column is rigid and the head may be turned about a vertical axis to present the wheel to the work at any desired angle.

To drive the work head, a worm-driven reducing gear inclosed in a case, bolts to the motor case, with the squared end of a flexible shaft connecting with the end of the rotor shaft. A flanged pulley, substituted for the grinding wheel, takes a small belt to drive the internal grinding spindle.

— 86 —

Reamer Sharpener

Barber-Colman Co., Rockford, Ill. [Vol.67,pp.488 and 754]

The Barber-Colman System, controlling the reamer size, combines the reamers and a sharpening machine. The reamers are designed to be in step with the machine during the process of sharpening, and one cannot be used without the other.

The requirements particularly considered are a diameter cutting clearance back of the flute, and a secondary or relief clearance. With this machine, sharpening is completed under positive mechanical control, which is almost fully automatic.

A 2-hp. motor supplies power for operation, and drives an extended shaft carrying the drive pulleys for the wheel spindle and the platen. Mounted on the main platen is an auxiliary platen pivoted at one end so that it can follow the form of a cam at the other end. This cam is used to reverse the mo-

tion for grinding left or right-hand power reamers.

A gear box mounted on the end of the auxiliary swivel platen provides for automatic indexing. The headstock is gear driven to a spline shaft connected with the feed change gear box. Dead centers are used and the work is driven by a dog.

Two cam slide blocks are provided, one to permit the grinding of back taper, and the other to vary the length of bevel on the end of the reamer, without the necessity of changing clearances on the form of the nose. Special cams can be supplied for any reasonable form required on special reamers.

The grinding wheel is of the straight cup type.

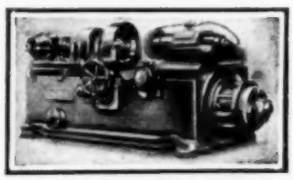
Weight, 4,000 lb., approximately.

— 87 —

Grinder, Brake-Drum

Cincinnati Grinders, Incorporated, Cincinnati, Ohio. [Vol. 67,p.367]

This machine was developed for the production grinding of automobile brake drums at the rate of 45 per hour. The unit is entirely self-contained, and



has a 30-hp. motor built into the machine. The spindle is of large proportions in order to eliminate vibration and make it possible to take heavy cuts with the grinding wheel. A grinding wheel 14 in. in diam. with a 3-in. face is used.

The work is held on a heavy face plate by means of air chucks, and the workhead is driven by a 2-hp. variable-speed motor controlled by a push-button incorporating dynamic braking. The work saddle is provided with an adjustable dead stop to facilitate positioning of the work in relation to the grinding wheel

When direct current is not available, a generator may be attached to the machine.

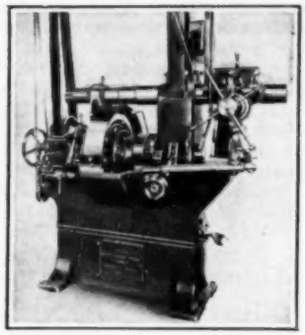
Weight, 12,500 lb. net.

— 88 —

Grinder, Brake-Drum

Bryant Chucking Grinder Co., Springfield, Vt. [Vol. 67,p.753]

This machine was designed especially to grind the brake drums of automobiles after they have been secured to the wheels. The swing of the machine is sufficient to take in the full diameter of a truck wheel.



The machine has the characteristics of the regular Bryant grinding machine. The grinding head is carried upon a cylindrical bar mounted above the bed and has traversing as well as a swinging movement upon the bar. Automatic traversing movement is also available to the wheel slide, or it may be operated by hand, if desired. Cross feed is applied by swinging the head upon the bar.

The workhead is driven through steel herringbone gears from a two-speed overhead countershaft. The holding chuck is designed to support the work by the wheel rim, and may be operated either manually or by compressed air. A substantial guard encircles the chuck and work.

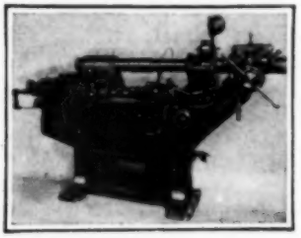
The wheel spindle runs in Timken bearings and is driven by a 5-in. belt. It is designed to swing a wheel 11 in. in diameter.

—89 —

Grinder, Special, No. 20, for Crankshafts

Bryant Chucking Grinder Co., Springfield, Vt. [Vol.67,p.719]

This special machine is designed to grind the holes in the ends of crankshafts of automotive engines. The special features consist of extra



length of bed, a lever-operated mechanism to close the driving collet, a disappearing table to assist the operator in placing the heavy shaft in the machine, and a special steadyrest to provide support for the end of the shaft while grinding.

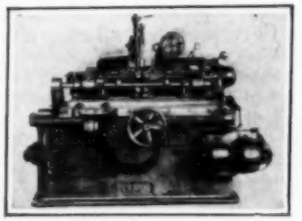
The operating table is in three sections, the front and rear sections being rigid and at a constant level, while the center section is capable of a vertical movement of 4 to 5 in. This center section is raised to support the crankshaft when it is being placed on centers.

— 90 —

Grinder, Crankpin, Hydraulic, 10-Inch

Landis Tool Co., Waynesboro, Pa. [Vol.67,p.877]

For the production grinding of the crankpins of small motor cycle, refrigerator or stationary engine crankshafts, the 10-in. hydraulic grinder has been es-



pecially developed. It is made in a 10x16-in. and a 10x32-in. size.

On double-throw crankshafts, the two end pins are ground first, each end of the pin being supported in a work rest. When the center pins are ground, a locating bracket is attached to the right-hand head and the work rests are moved to the two center pins.

The work is driven from both ends at 100 r.p.m. The grinding head is equipped with special alloy steel spindle, hardened and ground. A grinding wheel 30 in. in diam. is used. The wheel moves toward the work at high speed until it starts to grind, then automatically slows down to the grinding feed and advances against a positive stop. Reversal is at rapid traverse speed. The work carriage is traversed by hand.

Power for the hydraulic wheel feed is furnished by a geared pump and a portion of the base of the machine is used as a container for the oil.

The machine may be arranged for either lineshaft or direct motor drive.

— 91 —

Grinder, Locomotive Guide Bar, Hanchett

Machinery Company of America, Big Rapids, Mich. [Vol.67,p.396]

In this Hanchett locomotive guide bar grinder the work is supported upon a stationary table, while the grinding wheel head is reciprocated. Increased accuracy and production is claimed for this principle of design.

The rotating or swiveling

guide-bar holder is so arranged that one setting of work can be installed while another setting is being ground. The particular machine shown will handle work up to 84 in. in length and 20 in. in height.

The bed has a three-point bearing on the floor and has a length of 139 in. and a width of 30½ in. The platen table measures 100x24 in. and is provided with T-slots.

A grinding wheel 30 in. in diam., by 4 in. face, is regularly furnished. The spindle is mounted upon two SKF radial bearings and is driven by a 25-hp. motor through a silent chain. The carriage is traversed by rack and bull gear at rates of 12, 17 and 24 ft. per min. Automatic cross feed of the carriage ranging from 0.0005 to 0.005 in. is also available.

Coolant is supplied by a motor driven pump from reservoirs cast in the base. Automatic lubrication is also provided for all important parts.

Floor space, 7x13½ ft.; weight, 17,000 lb. net approximately.

— 92 —

Grinder, Radius, Oscillating, No. 42

Van Norman Machine Tool Co., Springfield, Mass.. [Vol.67, p.391]

The No. 42 oscillating grinding machine is primarily adapted for grinding the ball raceway in large-size ball bearing outer rings, within the maximum

work head swing of 16 in., but is also adaptable for general radius grinding. Unit motor drive for each functioning element is incorporated in this design. The work head is supported by vertical oscillating posts. Longitudinal and cross slides are provided to position the work head in correct off-set relation with the vertical oscillating center or axis. The driving motor is movable with the work head.

The wheelhead is of the block type and is bored to receive a quill-type wheel-spindle assembly. The motor driving the wheel spindle is also movable with the wheel head.

The motor used for driving

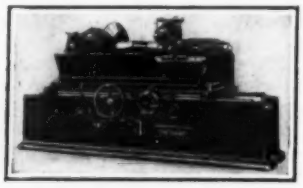
the automatic cross feed of the wheel spindle and the automatic oscillation of the work head is mounted with adjustable features on the rear body of the machine. Adjustable clamping means are provided so that the work head can be oscillated from the required angle and length of arc in relation to the axis of the wheel spindle.

— 93 —

Grinder, Spindle, Heavy-Duty

Cincinnati Grinders Incorporated, Cincinnati, Ohio. [Vol. 67,p.679]

The special grinder shown was designed for the particular purpose of obtaining a good finish and accurate surface on large machine-tool spindles. It



will grind work 48 in. in length, and 16 in. in diam., or 31 in. through the gap in the table. Convenient control levers are featured.

The headstock is driven by a 2-hp. variable-speed motor through a worm and wheel. The motor is set at right angles to the line between centers so that any inherent vibration of the motor will not tend to cause chattered work.

One of the features claimed to contribute to the high accuracy obtained on the machine is the massive wheel slide, which weighs 1,600 pounds.

The grinding wheel is driven through Texrope strands from a 20-hp. motor mounted in the bed directly below the spindle. The spindle is located in special bronze bearings and is automatically lubricated. End thrust is taken up by a ball thrust bearing. The grinding wheel is 26 in. in diam., with a 4 in. face.

Another feature is the forced lubrication system used to lubricate the table ways.

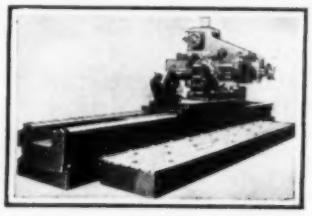
— 94 —

Grinder, Way, Traversing-Rail Type

L. Sichel, Room 740, 200 Fifth Ave., New York, N. Y. [Vol. 67,p.251]

In this type of way grinder, the work is held stationary and the grinder heads are traversed on rails along the ways to be finished. The machine was developed in Germany.

The double radial arm, carrying the grinding heads, slides vertically on a rectangular



column. This column may be turned in a full circle and the radial arm can be elevated or lowered either by hand or by power. It is counterbalanced by a self-acting hydraulic pressure device.

One arm of the radial is furnished with two independent grinding heads powered by 1½-hp. built-in motors. Either cup or saucer wheels can be used on either spindle. The units are mounted on compound slides to allow adjustment for height along the rail and swiveling within a full circle for the finishing of flats, Vs or dovetails at any desired angle. The universal heads accommodate wheels up to 10 in. in diameter.

For dealing with wide flats a segment wheel head is furnished on the other radial arm. This wheel is also direct connected to its driving motor spindle.

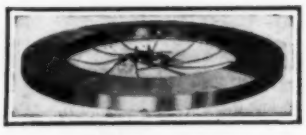
The column with the radial arm is reciprocated, and several traversing speeds are available through a gear box or electrical control. The machine illustrated has a bed length of 29 ft. and a grinding length of 20 ft. It is said to be accurate within 0.0004 in. It may be driven by either a.c. or d.c. motors.

— 95 —

Magnetic Chuck, Improved, for Surface Grinder

O. S. Walker Co., Inc., Worcester, Mass. [Vol.67,p.366]

The all-steel rotary magnetic chuck illustrated is intended for a specially designed vertical-spindle, surface grinding ma-



chine. The outside diameter is 100 in. and the inside diameter 70 in. All of the face is magnetically active. Current is supplied to the chuck through a hollow post and to this post the leads from ten segments of the chuck are carried through pipes. The chuck requires 3,360 watts for operation and its approximate weight is 4,500 pounds.

Another type of chuck made by this company is adapted for grinding knife bars and similar work where it is desired to grind both sides and edges without disturbing the setting of the chuck. The chuck is in the form of a block and contains one coil which develops magnetism in both the vertical and the horizontal faces.

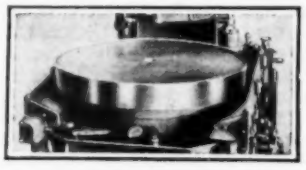
Another similar type of chuck has both front and back faces magnetically active. The chuck is 11 in. high and 14 in. in length and requires 150 watts for its operation.

— 96 —

Magnetic Chuck, 36-Inch, for Surface Grinder

Blanchard Machine Co., Cambridge 39, Mass. [Vol.67,p.367]

An oversize magnetic chuck, 36 in. in diam., was developed for the No. 16 Blanchard surface grinder. This is a complete magnetic chuck built into



the machine in place of the standard 26-in. chuck and is not removable. It reduces the vertical range of the belted machines to 8 in. and of the direct motor-drive machines to 10 in. The face of the chuck is of the fine divided type, similar to the standard chuck, but it is magnetic to the extreme edge. Tapped holes are provided, suitable for securing center stops. A one-piece steel construction is used to insure a water-tight and durable chuck.

The chuck is recommended for rings up to 36 in. in diam. and for long and irregular pieces. It is also suitable for small pieces, if they are properly distributed.

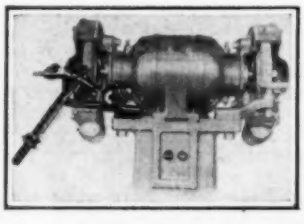
— 97 —

Grinding Attachment, Twist Drill, for "Hisey" Electric Grinders

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.67,p.639]

The twist drill grinding attachment is for use on this company's electric bench or floor stand grinders. It is a complete, self-contained unit and can be quickly mounted in position on the standard tool grinding rest.

A graduated micrometer screw



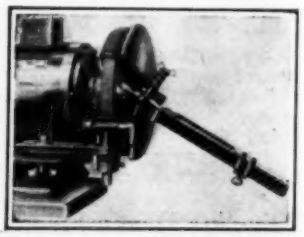
adjustment is used to obtain identical lip lengths. By means of the attachment, straight or taper shank twist drills from ¼ to 1¼ in. in diam., inclusive, can be ground. The unit can be supplied for use with wheels up to 12 in. in diameter.

— 98 —

Grinding Attachment, Twist Drill

Standard Electrical Tool Co., Cincinnati, Ohio. [Vol.67,p.878]

The twist drill grinding attachment is shown applied to an electric bench grinder with



wheels 10 in. in diam. It is easily interchanged with the regular tool grinding rest and can be quickly mounted in position.

The device is equipped with a graduated micrometer screw, so that gages are not required. It is used for grinding either straight- or taper-shank twist drills ranging in size from ¼ to 1¼ in. It can be furnished for use with wheels up to 12 in. in diameter.

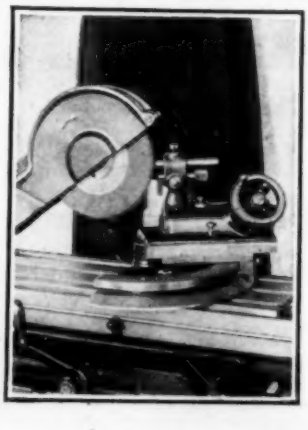
— 99 —

Wheel Truing Attachment

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.67,p.364]

The radius and angular wheel truing attachment is designed to provide an accurate means for shaping abrasive wheels used on the No. 2 Brown & Sharpe surface grinding machine.

The attachment permits the forming of both convex and concave outlines having radii varying from 0 to 1 in., and to face angles up to 90 deg.



either side of zero. Numerous combinations of radial and angular shapes can also be developed.

The attachment uses a diamond tool clamped in an upright post on a movable slide. The slide is graduated for fine adjustment, and can be locked in position. The slide is carried in a swivel, and the base on which it is mounted is graduated to 90 deg. either side of zero.

The attachment is bolted to the machine table.

Weight, 26 lb.

— 100 —

Wheel-Truing Unit for Landis Crankpin Grinder

Ross Manufacturing Co., Cleveland, Ohio. [Vol.67,p.753]

Economy and speed, without the sacrifice of finish, are claimed as advantages of the wheel-truing device developed for the 16-in. Landis hydraulic crankpin grinder.

The unit consists of a bar of special alloy that fits into the

pot chucks of the grinder and is recessed for both a metal-disk roughing tool and an abrasive wheel-finishing or master tool.

When bolted to the bar, the wheel of the dresser is set at a 10-deg. shearing angle. The roughing tool may be used as a preliminary to finish truing.

A pin in either end of the bar automatically gives correct alignment. The unit, equipped complete with a master tool, weighs approximately 35 lb., so that it can be easily handled.

— 101 —

Grinding Wheels

Blanchard Machine Co., Cambridge, Mass. [Vol.67,p.404]

A line of silicate cylinder grinding wheels has been developed for Blanchard surface grinding machines. The grinding wheels are made in various grades to suit the class of material, width of surface, and finish desired. The grades are designated by numbers, and a table is furnished showing the grades generally suitable for various materials.

— 102 —

Grinding Wheel, Aloxite, "AA"

Carborundum Co., Niagara Falls, N. Y. [Vol.67,p.397]

A line of Aloxite "AA" grinding wheels is being marketed for toolroom work. They are made of an aluminous abrasive and are claimed to have the proper sharpness and just the degree of toughness or temper, combined with proper bonding, to make them fast and free cutting on toolroom precision work. The wheels are suitable for both light and heavy cuts, and are claimed to work without creating undue heat. The wheels are standardized in various grades and grit.

— 103 —

Grinding Wheel, Internal, Improved

Carborundum Co., Niagara Falls, N. Y. [Vol.67,p.489]

Concentricity of the arbor hole with the grinding face is positively assured in the improved line of internal grinding wheels. The arbor hole itself is formed within very close limits of accuracy and the wheels are uniform in both diameter and thickness.

The abrasive structure is such that a free clean fast-cutting wheel results that holds its edge and produces true holes without bell mouth. Proper grits and grades for various classes of internal work are available. The wheel is particularly developed for use on automatic and semi-automatic machines.

— 104 —

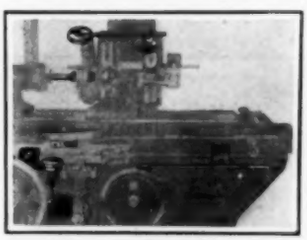
Grinding Equipment for Circular Forming Tools

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.67,p.176]

The contours of screw-machine forming tools and work of a similar nature can be ground with this equipment on this company's No. 13 universal and tool grinding machine. The equipment is furnished either as a complete set or in separate units.

Floating work arbors hold the work in position between centers and a radius truing device and magnifying glass provide for accurately truing the grinding wheel. A dial indicator mounted on the bed permits accurate reading of the table movement.

A vernier scale attached to the sliding table gives accurate readings on long work beyond the capacity of the dial indicator. Fine annular adjustments



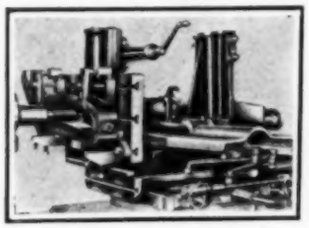
of the upright are facilitated by another vernier located on the cross feed carriage. When grinding angles the swivel table vernier provides for additional adjustments.

— 105 —

Grinding Attachment for Valve Gear Links

Micro Machine Co., Bettendorf, Iowa. [Vol.67,p.374]

A locomotive valve gear link-grinding attachment is available for use with Micro internal grinders, models B. G. and



F. G. The attachment is suitable for grinding the Walschaert, Stevenson, Young and other types of links with radii within a range of 20 to 100 in. It is a self-contained unit having its own ½-hp. motor and is located in the center of the T-slot of the work table. Brackets are furnished for holding the links in position for grinding.

The travel of the work platen is governed by adjustable reversing dogs and the main machine table oscillates slightly to insure uniform wheel wear. The total cross travel is 30 in. and there are also nine vertical adjustments for feeding the wheel to the work. The attachment is supplied with a heavy-duty, ball-bearing spindle for holding a wide-face wheel. Weight, 1,300 lb. net.

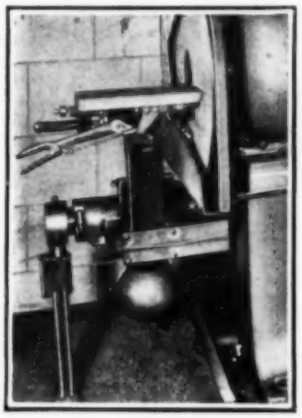
—106 —

Grinder Attachment, Mechanically-Oscillating Work Table

Gardner Machine Co., Beloit, Wis. [Vol.67,p.388]

The mechanically-oscillating work table is intended for use on disk grinders made by this company. The unit consists of a table similar to that regularly used, connected to a worm gear driving mechanism at the rear of the machine and driven either by an individual motor or by a belt from a countershaft. In operation the table rocks or escillates automatically.

The work is fed to the grinding member by means of an adjustable spring tension. An adjustment is also provided in the connecting links to permit varying the length of table travel. The table can be tilted forward to the loading position.



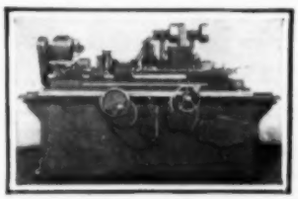
The oscillating type tables are built for four sizes of hand-operated single-spindle disk grinders, namely, 20, 26, 30 and 40 in., and also may be applied to the Nos. 4, 6, 7, 7½, 8 or 10 Gardner grinders.

— 107 —

Grinding Attachment, Cam, Automatic

Norton Co., Worcester, Mass. [Vol.67,p.369]

The automatic-indexing, cam grinding attachment is intended to be applied to Norton Type A and Type BA cylindrical grind-



ing machines for use in grinding cams integral with the shaft.

Only two manual operations are required at each indexing of the shaft. These motions consist in the backing off of the wheel index and the hand traverse of the table to bring the next cam into position in front of the wheel. The automatic movement of the rocking bar and of the master cam roll are by pneumatic and mechanical control. These movements take place as the wheel index and table are moved into position for grinding each cam.

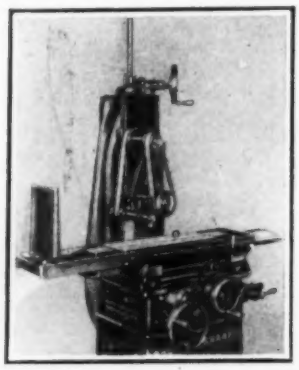
The attachment can be applied to cam grinding machines already in use.

— 108 —

Attachment for Brown & Sharpe No. 2 Surface Grinder

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.67,p.517]

The attachment is a mechanism for driving small grinding wheels ⅛ to 1¼ in. in diam. at a



high rate of speed and is readily and quickly applied to this company's No. 2 surface grinder. Slots and similar small surfaces, the location of which does not permit the use of a wheel of large diameter, can be readily ground with the attachment.

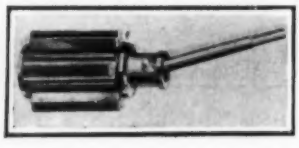
The attachment is securely clamped in position in the wheelhead. The drive is by a canvas belt from the spindle.

— 109 —

Grinder, Cylinder, Rigid, "Ammco"

Automotive Maintenance Machinery Co., 549 W. Washington St., Chicago, Ill. [Vol.67, p.520]

Five stones are used in the "Ammco" rigid cylinder grinder, so that no two stones are diametrically opposed. This con-



struction is said to eliminate chatter, to produce more accurate work, and to eliminate stone breakage. With four sets of stone carriers, the tool handles all bores from 2⅜ to 4½ inch.

Four grades of stones are supplied. These stones are cemented in steel jackets and are interchangeable in the different sets of stone carriers. The carriers are rigidly held in radial slots at both ends and are supported on hardened and ground cones. The tool is ruggedly constructed of hardened steel throughout, but is light and easy to handle.

— 110 —

Grinder Stand, Cylinder, Radial, "Ammco"

Automotive Maintenance Machinery Co., 549 W. Washington St., Chicago, Ill. [Vol.67, p.676]

The "Ammco" radial cylinder grinder stand is a universal fixture that is attached to the top of the cylinder block to provide an easy method of raising and lowering the portable electric drill and cylinder grinder during the reconditioning process.

A particular feature of the stand is the universal mounting

bracket with a swinging radial arm that enables the mechanic to grind all cylinder bores with only one setting of the tool. Another feature is the hollow central column for the cooling kerosene which is brought to the cylinder bore through a flexible tube.

The mounting block weighs 10 lb. and is readily fastened to the cylinder. The drill mounting bracket is universal, and will take any ⅜- or ½-in. portable electric drill. Special brackets may be obtained for installing the stand on benches or any part of the chassis to hold an electric drill for other drilling operations.

— 111 —

Nut-Burring Fixture for Disk Grinder

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.67,p.752]

This special double fixture for grinding off the punch burrs on the bottom faces of square and hexagon nuts is attached to a special tub or main top casting of the No. 49 53-in. disk grinder made by this company.

The fixture consists of two parallel top bars carrying adjustable shoes with hardened steel faces that press down on the nut top. Side guide bars provide a channel across the face of the grinding disk. The top bars are adjusted to give a slight slant down toward the discharge end and the shelf is adjusted to bring the nuts to a uniform finished thickness.

Work is fed from the loading

pans to the guides, where it is pushed through the grinding channels by levers having hardened steel push fingers. The strokes may be varied from 50 strokes per min. for 1¼-in. nuts to 100 strokes per min. for ⅜-in. nuts.

— 112 —

Grinding Fixture, "Namco"

National Acme Co., Cleveland, Ohio. [Vol.67,p.833]

For the uniform grinding of chasers used in "Namco" thread-cutting tools, the fixture shown was developed. It can be used on any grinding equipment fitted with a table. By means of carefully graduated adjustments, it is possible to obtain uniform and accurate chaser grinding.

A set of five adaptors furnished with each fixture takes care of the entire range of chasers used in Namco self-

opening dieheads. The indexing plate is adjustable to swing to an angle of 90 deg in each direction. The holder for the adaptors is also adjustable and is graduated for work at various angles. Both the face and the throat of the chaser can be ground with only one wheel because of the flexibility of the fixture.

On a chart that accompanies the fixture are listed the proper angles for grinding the chaser parts, correct cutting speeds, and also the proper lubricant for thread-cutting.

Lathes

— 113 —

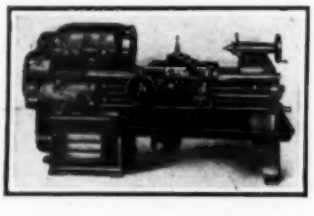
Lathe, Geared-Head, 14-Inch

Reed-Prentice Corporation, Worcester, Mass. [Vol.67,p.388]

The 14-in. lathe is of the sliding gear type, and is intended for heavy-duty production work. The geared head is constructed with nine gears operated by levers at the front of the headstock, giving speeds from 17 to 384 r.p.m. The drive is by belt from a built-in motor mounted within the cabinet leg. An adjustable spring idler tightner is provided.

The cross and longitudinal feeds, of which there are 55, are operated by a single lever located in the apron. The tailstock has an improved type of binder, and the carriage is arranged to accommodate a taper attachment. An oil pan, pan and piping can also be applied.

The spindle, made of heat-treated chrome-nickel steel, is mounted in bronze bearings. The gears in the headstock and the quick change box are made of chrome-nickel steel, while the gears in the apron are made of high-carbon steel. The back shafts run in ball bearings, as does the lead screw.



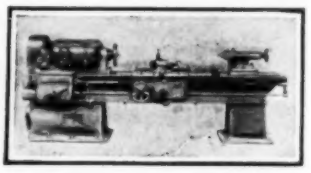
The machine has a swing of 16½ in. over the bed and 10 in. over the compound rest.

— 114 —

Lathe, Geared-Head, 12-Speed

Hendey Machine Co., Torrington, Conn. [Vol.67,p.398]

The geared-head lathe will swing work 20 in. in diam. over the shears, and 12 in. in diam. over the carriage. It is supplied with beds from 6 to 20



ft. in length. It is driven by belt to a constant-speed pulley either from a motor in the cabinet leg, or from an overhead countershaft.

Twelve spindle speeds are available, ranging from 7.8 to 373 r.p.m., controlled by levers on the headstock. All gears are cut from steel and are heat-treated, and the gear shafts run on ball bearings.

Thirty-six feeds, ranging from 12 to 672 rotations of spindle per inch, and the same number of threads, from 1 to 56 per inch, are available. Change gears can be placed in the driving train to cut threads not listed on the index.

The apron is of double-wall construction, and is provided

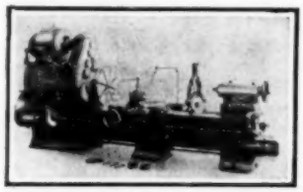
with a safety interlock. Regular equipment includes large and small faceplates, center-rest, follow-rest, micrometer carriage stop and power cross-feed. An oil pan is furnished extra. A carriage turret and forming attachment may also be supplied instead of the tailstock.

— 115 —

Lathe, "Time-Saver," Pond, Improved

Niles Tool Works Co., Division of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.67,p.397]

Greater range of spindle speeds, larger driving gears, Timken roller bearings, solid spline shafts for the sliding gears, together with a new taper attachment, are some of the features of the improved line of



Pond "Time Saver" lathes. The lathe is built in three sizes, of 27-, 30-, and 36-in. swing, and with any desired bed length. The drive may be by a variable-speed d.c. motor, or a constant-speed a.c. motor or single pulley. In the two latter cases, all feed changes are made mechanically, twelve speeds being provided.

The motor pinion and its mating gear have helical teeth, while the other gears in the head are straight spur. All gearing is of heat-treated alloy steel and is inclosed. The position of the drive motor has been reversed, since the pinion is placed nearest the faceplate. A patented feature of the lathe is a jog push button switch.

The carriage is equipped with a power rapid traverse as a regular feature, and is driven by a separate motor. The apron is of one-piece box form, and all the gears and clutches contained therein are of heat-treated steel.

The quick-change gear box makes available 32 feeds and threads, and 16 additional feeds and threads may be obtained through change gears.

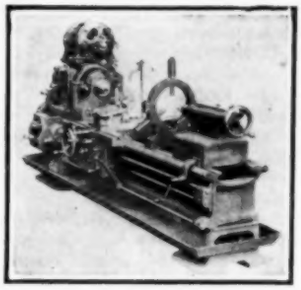
— 116 —

Lathes, Geared-Head

Cincinnati Lathe & Tool Co., Cincinnati, Ohio. [Vol.67,p.406]

The single-pulley drive, geared-head lathe can be furnished in sizes to swing work 16¾ to 32 in. in diam. Sixteen spindle speeds are available in each machine.

All gears in the head are made of manganese-chrome alloy steel, heat-treated and ground. The housing is of box-type construction and forms a reservoir for the oil. All bearings, except the main spindle bearing, are automatically lubricated by the splash system. The main spindle bearings are oiled separately through sight feel oilers.



The clutch or driving mechanism is an integral part of the housing, and adjustment for wear is possible. The clutch is of the compression disk type. It may be operated from the apron lever, or from a lever located on top of the headstock. The same lever is also actuated when the gear changes are made.

The single-pulley belt model may be converted to motor drive any time after installation.

— 117 —

Lathe, Precision, 11-Inch

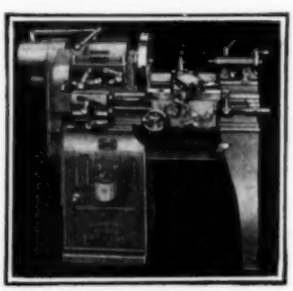
Sebastian Lathe Co., Cincinnati, Ohio. [Vol.67,p.555]

This small high-speed lathe is intended for precision work and has engine lathe features. It swings work 12 in. in diam. over the bed and 22½ in. long between centers. The collet capacity is ¾ in. It is furnished in bed lengths of 3, 4, 5 and 6 ft. Drive may be either by self-contained motor or by single pulley.

Eight speeds are available ranging from 26 to 260 r.p.m. These are selected by two shift levers on the front of the headstock.

Feeds and threads are also obtained by two levers on the quick change feed box. The thread ranges are from 6 to 96 threads per inch.

The cross feed collar is of the friction type, as also the compound rest collar and are graduated. The latter has a travel of 2 in. The depth stop is provided for chasing threads,



and a thread chasing dial is incorporated.

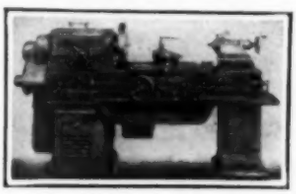
The weight of the 4-ft. bed model crated, is 1,000 lb. approximately.

— 118 —

Lathes, "Monotrol," Improved

Sidney Machine Tool Co., Sidney, Ohio. [Vol.67,p.598]

Several improvements have been made to the line of "Monotrol" lathes made by this company. The headstock is now equipped with herringbone cut gears with the shafts mounted



on Timken roller bearings throughout, including the main spindle. A fine finish cut without gear marks is claimed.

All gears, clutches, and cams are made of alloy steel, heat-treated. Changes of speed can be made by the capstan control while the spindle is in motion, as all gears are constantly in mesh. Force-feed lubrication is provided to all moving parts in the head.

Positive friction drive is provided both for longitudinal and cross feeds on the apron, which is a heavy-duty, double-plate type.

— 119 —

Lathe, Turret, Universal, No. 5

Foster Machine Co., Elkhart, Ind. [Vol.67,p.167]

The No. 5 universal turret lathe is built in two types, an eight-speed all-geared head, and a six-speed cone head, each having a bar capacity of 1⅛ in.,

a swing of 17½ in. over the ways, and 9½ in. over the cross-slide.

In the geared-head type speed changes can be made without stopping the machine and are effected through multiple-disk clutches and one sliding gear. It can be driven from a countershaft or directly from a motor mounted on the head. The cone head machine is provided with a three-step cone pulley and back gears.

The universal carriage is provided with six longitudinal, reversible feeds. Six feed changes are also obtainable on the cross-slide, and both the carriage and the cross-slide are provided with adjustable stops. The cross-slide is provided with a square turret.

The hexagon turret is designed for use with either shank or flanged tools. The power feeds may be knocked out at any predetermined point. The effective turning movement is 10¾ in. and the maximum distance of the face to the spindle nose is 20 in. Six power feeds are available to the turret slide.

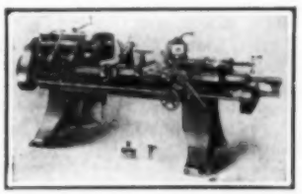
Cone head machine 3,000 lb. net.; geared-head type 3,155 lb. net.

— 120 —

Lathe, Turret, Universal, Brass, 20-Inch

Acme Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.174]

The 20-in. full-Universal turret lathe was designed to machine a variety of parts made of brass or similar metals. It is rigidly constructed throughout,



so that vibration is reduced to a minimum when unbalanced castings are rotated at high speed.

The head is cast solid with the bed and is regularly furnished with a 3-step cone pulley and friction back gears. A single pulley drive with an all-geared head, providing twelve speed changes, can also be supplied.

The slide on which the hexagonal turret is mounted may be fed quickly by means of a turnstile, or slowly by means of a hand-operated crank. A cross movement is also provided in the turret.

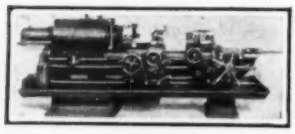
The entire cross-slide carriage may be traversed the entire length of the bed, so that it is possible to use long piloted boring bars. A taper attachment to the turret is also supplied, as well as a bed-type chasing attachment. For leader taps and dies an apron-type chasing attachment for the turret carriage is available.

— 121 —

Lathe, Turret, Heavy-Duty, 2L

Gisholt Machine Co., Madison, Wis. [Vol.67,p.379]

This universal-type turret lathe, designated as type 2L, has a square turret on the side



carriage and a cross feeding hexagon turret on the rear carriage. A fixed center turret is furnished as optional equipment.

The machine is designed to accommodate bar work up to 3½ in. and chucking work up to 16 in. in diam. Power is transmitted from a single pulley through a multiple-disk friction clutch and a train of hardened alloy-steel gears. Speed changes are accomplished by means of sliding gears on splined shafts.

The spindle is mounted in adjustable babbitt bearings but all other shafts and many parts, including those in the apron, are mounted upon ball bearings.

A rapid traverse is provided for the longitudinal movement of the side carriage and of the turret carriage, also a rapid traverse for the in-and-out movement of the square turret on the cross slide. The flat ways of the machine are covered with hardened steel plates.

The machine is driven by a 10-hp. motor connected by either a V belt, a flat leather belt or silent chain. A lead screw thread cutting device and a taper attachment can be furnished.

Floor space, 45x128 in.; weight 7,200 lb. net.

— 122 —

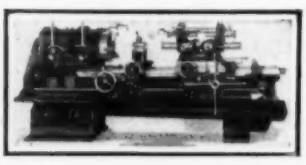
Lathe, Turret, Universal, With Duo Control, Improved

Acme Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.401]

Many radical changes have been made in the heavy type full universal turret lathe of 4½-in. bar capacity. Ball and roller bearings are featured together with simplified control of the geared head.

The all-geared head, driven by a single pulley, is operated through alloy-steel gears. All speed changes and changes of direction are made by two levers conveniently positioned in front of the headstock. All the transmission shafts revolve upon Timken roller bearings, and the thrust on the spindle is taken by a ball bearing. The bowl has been brought up to full height so that all bearings are amply supported.

Each apron contains a separate feed transmission of the sliding type providing twelve changes. There are two points of control on the apron itself so that the operator need not move from the operating position to make changes in speeds or feeds.



The machine is regularly furnished with a flat turret, but can be furnished with a hollow-hexagon turret without extra charge. A taper attachment and a chasing bar can be furnished at an additional cost.

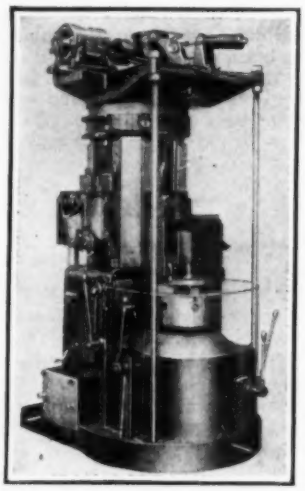
Swing over bed, 25 in.; swing over carriage wings, 22½ in.; swing over cross-slide, 17 in.; maximum turning length, 44 in.; spindle speeds, 8 to 266 r.p.m.; horsepower required, 10 to 15; weight, 8,500 lb.

— 123 —

Lathe, Turret, Vertical, Automatic

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.67,p.513]

"Integrated production" is the keynote of this automatic vertical turret lathe. It is provided with a single spindle and a monitor type of turret, each tool



head being capable of performing a group of operations simultaneously. The 20-in. size offered has four faces on the turret, one being a chucking position. Each tool head is provided with independent changes of feed and speed, and once set the complete cycle is automatic. The ease of set-up and quick change-over make it adaptable for smaller quantities than are justified on the ordinary special-purpose machine.

The work capacity of the machine is 20 in. in diam. and 7 in. in height. It will swing 24 in. in diam. up to 7 in. above the face of the chuck, 21 in. in diam. between the way guards, or 16 in. in diam. up to 15 in. above the chuck face. The tool heads may be of plain, compound, universal or double purpose type, providing for vertical, horizontal, angular, or a combination of feeds.

Independent sets of quick-change gears provide ranges in spindle speed in three series having nineteen changes in each. Feed gear changes also run in three series of nineteen changes each.

Safety features have been incorporated to protect the mechanical units from injury.

The drive for the machine is by a 7½-hp., constant-speed motor.

Floor space, 72x56 in.; height overall, 122 in.; weight, 14,000 lb., approximately.

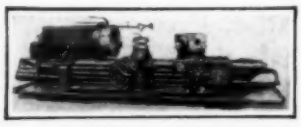
— 124 —

Lathe, Turret, Heavy-Duty, Type H, "Libby"

International Machine Tool Co., Indianapolis, Ind. [Vol.67, p.711]

Two sizes of the Type H heavy-duty turret lathe, of 29- and 32-in. capacity respectively, are available.

The driving motor is direct-connected to the primary drive-shaft and transmits the power through gears of heat-treated alloy steel. The driving shafts



run in ball or roller bearings, but the main spindle is mounted on bronze tapered bearings. The spindle speeds are in geometrical progression, ranging from 8 to 125 r.p.m. Lubrication is accomplished by the splash system.

The aprons are also designed for the splash system and where possible the shafts run in ball bearings. Both aprons have eight changes of speed, both forward and reverse. The feed box on the end of the machine carries a full set of change gears for cutting all standard threads.

The cross slide has automatic feed trip in either direction and the tool post slide has reversible cross feed independent of the longitudinal feed. The rapid traverse mechanism for both slides is independent of all feeds.

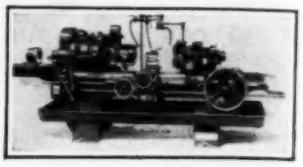
Weight, 22,000 lb. approximately.

— 125 —

Lathe, Turret, No. 3-A, With 3½-Inch Bar Capacity

Warner & Swasey Co., Cleveland, Ohio. [Vol.67,p.789]

Particular attention has been given to make this No. 3-A turret lathe easy to operate on large work. The No. 3-A turret lathe described previously is now designated as the No. 4-A model.



The head and bed are cast solid from a single piece of semi-steel. The ribbing and weight distribution has been arranged so that maximum stiffness is provided without bulk. The all-geared head has a short hollow spindle and short gear shafts mounted on Timken roller bearings. The gears run in a bath of oil and have ample overload capacity. Twelve spindle speeds are provided.

Patented way covers of heavy gage pressed steel completely inclose the ways under all working conditions. Sixteen longitudinal cross feeds are provided for the side carriage and two overlapping ranges are available.

The hexagon turret carriage is provided with a circumference binder which clamps it to the saddle. Sixteen right and left hand longitudinal feeds are provided as well as rapid traverse. The gear trains for both the square and hexagon turrets are made of steel, heat-treated, and are built for heavy feeding pressures. Both carriages may be fed independently.

— 126 —

Lathe, Turret, 1L

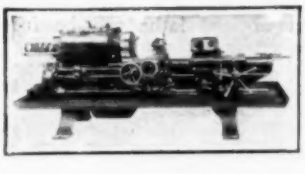
Gisholt Machine Co., Madison, Wis. [Vol.67,p.1036]

Bar work up to 2½ in. in diam. and chucking work up to 12 in. can be machined on the 1L turret lathe, which is similar in design to the larger 2L lathe described in Item 12' above.

The headstock is of rectangular box design with walls carried well up above the spindle bearings. The spindle is mounted on taper roller bearings, as are the headstock drive shaft, intermediate shaft and reverse shaft.

The drive is by a single pulley, and twelve spindle speeds ranging from 20 to 480 r.p.m. are provided through sliding gears and clutches mounted on splined shafts. From the headstock to the final drive of the carriages, all power shafts are mounted on ball bearings.

The full universal, full-swing, two-carriage principle common



to larger Gisholt turret lathes has been employed in this design. A fixed-center turret is standard equipment and a cross-feeding turret is optional. Eight independent reversible feeds are available in each apron and another complete range of eight feeds, each slightly coarser, is available through a lever in the headstock.

Longitudinal rapid traverse is provided for both carriages, and for the in-and-out movement of the square turret tool post on the cross-slide.

The ways of the bed are covered with hardened steel plates, ground in place, and are automatically lubricated.

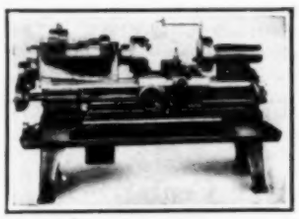
The maximum swing of the lathe is 17 in. over the ways and 14 in. over the side carriage, while the maximum distance from the face of the hexagon turret to the end of the spindle nose is 45 in. The machine without tools weighs 4,500 lb. net.

— 127 —

Lathe, 16-Inch, Modified for Broach Cutting

Springfield Machine Tool Co., Springfield, Ohio. [Vol.67,p.208]

The design of the 16-in. engine lathe has been modified for the manufacture of broaches. The machine has a hole 3⅛ in. in diam. through the spindle and also through the tailstock. A connected compound and plain



rest is furnished in order that forming tools can be used in connection with the finishing tool in the front.

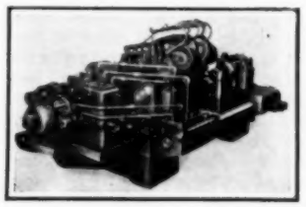
The spindle is of necessity much larger than the standard one, and the back gear ratios were increased to take care of the particular work in hand. An oil pan and coolant pump have also been provided.

— 128 —

Lathe, Crankshaft, Cheek-Facing and Pin-Turning, Melling

Crankshaft Machine Co., Jackson, Mich. [Vol.67,p.205]

The Melling cheek-facing and pin-turning lathe is designed to face the cheeks adjacent to the crankshaft and to roughturn the crank pins of a crankshaft in one operation. The machine is of the semi-automatic type in that the operator merely loads and unloads. The automatic cycle includes the lowering of the cradle and the tool holder to the cutting position, the feeding of the work table to the proper depth and then returning, and the raising of the cradle and tool-holder to permit



the removal of the finished work. The machine is furnished for crankshafts of the 4-, 6- or 8-cylinder type.

The machine is ruggedly constructed and has a heavy cast-iron bed upon which the sub-units are mounted. The sub-units consist of a rear master shaft equipped with eccentrics, a cradle assembly, a front master shaft, and a work spindle.

The machine is driven by a 20-hp. motor through a silent chain to the rear master shaft and the work spindle. The driving motor also operates the Oilgear feed pump. This pump operates the feed of the work table and the vertical movement of the cradle. The cradle has three automatic operating motions: Inward travel for the facing of the crank cheeks, a slower feed for the facing of the pin bearings, and a rapid traverse. The work table is operated from a series of racks and pinions from the Oilgear cylinder.

The crankshaft is held by two chucks and a center steadyrest. Coolant is provided from a large reservoir and pump.

Floor space 11x6 ft.

—129—

Lathe, Crankshaft, 34-Inch, Semi-Automatic

Wickes Brothers, Saginaw, Mich. [Vol.67,p.250]

This crankshaft lathe has been arranged to hold the crankshaft on anti-friction live centers and to drive from the previously - machined center bearing, to which a herringbone gear is clamped. The lathe cheeks, turns, and fillets the front bearings, the front end of

the crank, the rear bearings, oil grooves and flange. The cross-slides are arranged so that the tooling can easily be changed for machining different cranks in the same lathe.

The machine follows the general design of other Wickes crankshaft lathes and has power feed, quick-change gear box, automatic split feed, automatic feed stops, and an accelerating device so that the linear cutting speed of the tool remains constant as the tool advances to the center of the work. The drive is from a 15- to 20-hp. motor mounted on the headstock.

The cross-slides are equipped with patented electric rapid traverse mechanism for quickly advancing the tools to the cutting position and withdrawing them to the unloading position after the operation is complete.

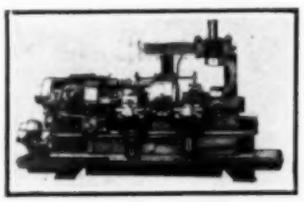
Weight 17,500 lb. about.

— 130 —

Lathe, Crankshaft, Center-Drive, Automatic

R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. [Vol.67, p.399]

Primarily, the center-drive, automatic crankshaft lathe is intended for forming the stub and



flange end bearings of crankshafts simultaneously. It can also be used, however, for forming the ends of rear axles and other work required to be formed on both ends.

The crankshaft is held in a central driving head by the previously machined center bearing and, in addition, is supported by adjustable centers.

The forming tools are carried in four toolblocks, two at the front and two at the rear, each pair being at opposite ends of the crankshaft. The members of each pair are fed toward the center by means of profile plates attached to the facing slide carriage. The rapid power traverse is automatically controlled, and an automatic stop to the spindle is provided.

Power to the headstock is transmitted through a single pulley. The tailstock is of the shaper-ram type and is operated by a rack and pinion. The loading device consists of a cradle, an overhead rail and an air hoist. After the crankshaft is lowered in position in the center head it is clamped by hand. Once the feed is engaged, the cycle is automatic.

— 131 —

Lathe, Axle-Journal Turning, 90-Inch Improved

Niles Tool Works Co., Division of Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.67,p.483]

In addition to the primary functions of turning journals and facing hub liners on locomotive and trailer wheel axles, the 90-in. locomotive-axle-journal turning lathe is claimed to be readily adaptable to receive a wide variety of attachments for

other operations in connection with locomotive wheel sets. These include devices for the single or double quartering of wheels with crank pins 90 deg. apart, including a crank-pin turning and burnishing attachment. Adjustment for engine stroke from 22 to 40 in. is provided.

To turn the journals of inside crank axles of 3-cylinder locomotives, a special rest may be furnished. The two journals may be turned at one setting without the necessity of reversing the wheels in the machine. A double crankpin turning or "quartering" of 3-cyl. engine wheel can also be accomplished by tilting the tailstock quartering attachment with a 30-deg. wedge block.

An attachment for re-turning the outside diameter and lipping for tire seat of mounted wheel centers is also being applied to one of these machines and crankpin grinding attachments and center crankpin turning attachments have been developed to further increase the scope.

The faceplate is driven by belt to eliminate gear marks. The drive is by a 15-hp. motor and the gear box gives four changes of faceplate speeds. Both headstock and tailstock are traversed along the bed by power.

— 132 —

Lathe, Center, Contin-U-Matic

Bullard Machine Tool Co., Bridgeport, Conn. [Vol.67,p.413]

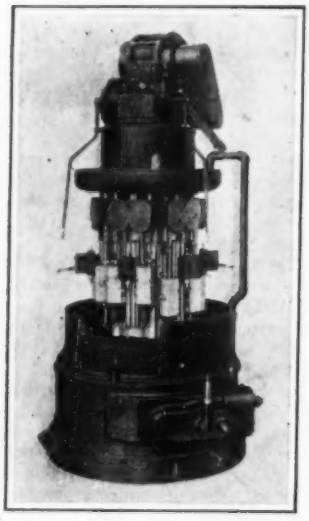
The Contin-U-Matic center lathe is an automatic multiple-spindle production machine for machining work held between centers in a vertical position. In basic principles it is similar to the six-spindle Contin-U-Matic chucking machine.

There are six work spindles in a carrier and six tool heads mounted upon a hexagonal tool

column built integral with the carrier. The respective spindles and tool heads form six individual units that are rotated slowly around the central column.

A tailstock and center is mounted on the upper portion of the tool support column and may be varied in height to suit the length of the work. The maximum capacity is approximately 20 in. on the standard machine. Spindle speeds available include a complete range up to a maximum of 300 r.p.m. The machine has a maximum capacity of work of 9¼ in. in diam. under the tool slides and 5¼ in. between the tool slides.

All tool heads are actuated by a common cam that provides for rapid advance, feed at a predetermined rate and rapid return with a short dwell to permit unloading and chucking of work. Each slide may be in-



dependently set for either plain vertical or plain horizontal stroke.

In operation the machine can be completely controlled from one position, while main drive clutch levers are provided at three different points.

Lubrication is of standard Bullard design with constant flow to all operating parts and pressure lubrication to external units. There are no rapidly-moving parts exposed. The cooling system provides constant circulation from a reservoir in the base.

Power requirements of the machine will range from 10 to 20 hp. Facilities are provided for motor drive. A constant-speed motor, either a.c. or d.c., may be used.

Weight 22,500 lb. approximately.

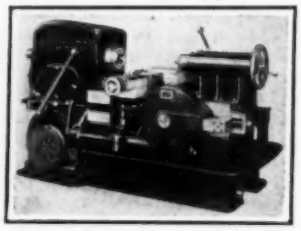
— 133 —

Lathe, Automatic

Sundstrand Machine Tool Co., Rockford, Ill. [Vol.67,p.553]

Before this automatic lathe was designed, a study was made of the machinery requirements for producing about 400 parts used in various fields, and the lathe designed to meet these conditions. The unit was constructed on the principle of giving maximum feed.

The headstock and bed are an integral unit for rigidity and the rear carriage is designed to



be practically integral with both, but is adjustable along the way.

The lathe may be driven direct from a lineshaft or by a motor mounted in the base. The final drive to the spindle is by means of a worm and wheel.

The feed box is simple in construction, and has one clutch for feed and two clutches for the rapid approach and reverse. The front carriage is fed longitudinally by two cams, one each side of the wormwheel used to drive them. The combination permits a longitudinal feed of 7 in. Any combination of movements between the carriage and cross-slide can be had. The front cross-slide has a power cross-speed of 2 inches.

The rear cross-slide is mounted on the rear carriage and is adjustable to suit the work. It is constructed unusually heavy to resist the upward strain of the cutter. The tail stock is also made heavy and has an anti-friction center of rigid construction.

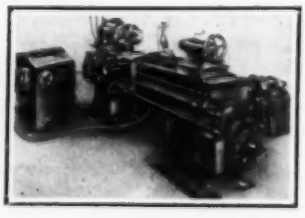
Specifications: Swing over front cross-slide 13 in., over rear cross-slide 15 in., over front carriage 18¼ in. and over ways 22 in. Hole through spindle 2¼ in. in diam. Floor space 75x55 in.

— 134 —

Lathe Equipped with Keller Form-Turning Device

Keller Mechanical Engineering Corporation, 70 Washington St., Brooklyn, N. Y. [Vol.67, p.560]

The device is attachable to any screw-cutting engine lathe having power cross feed and enables the lathe to reproduce form work from a templet by



means of a single-pointed lathe tool.

The outfit consists of a set of Keller magnetic controls used in combination with a standard Keller tracer head with the usual automatic controls. The arrangement is similar in general construction to that used in the die and tool making machines made by this company.

At the right-hand end of the lathe bed are two power boxes containing a small electric motor, suitable speed reducing gears and clutches. One box drives the regular lead screw and the other the cross feed. The motors operate continually and the clutches are controlled magnetically through the tracer mechanism.

The contour edge of the templet represents the mid-section of the solid being formed. This templet is clamped to the rear wing of the carriage and is contacted by a pendulum-type electrical control device with very sensitive touch. The feed is synchronized with the number of turns of the lathe spindle and may be set to any dimension covering a large range. The path of the tool point over the contour is a series of very minute steps.

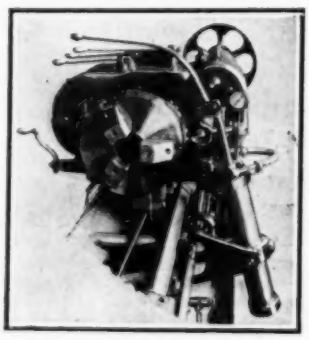
The attachment can be used for the production of many odd-shaped pieces, such as spinning chucks.

— 135 —

Chuck for Turret Lathe, Hydraulically-Operated

Foster Machine Co., Elkhart, Ind. [Vol.67,p.381]

A hydraulically-operated mechanism for opening and closing the Foster-Barker wrenchless



chuck is available for installation on the Foster No. 3-B universal turret lathe.

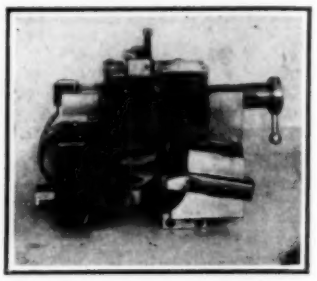
The mechanism is entirely operated from pressure supplied from the coolant pump and is piped directly with the coolant system. The action of the mechanism is controlled by a hand crank in the front of the machine. It is claimed to relieve fatigue of the operator and to insure a uniform chucking pressure at all times.

— 136 —

Taper Turner, Model M

Jones & Lamson Machine Co., Springfield, Vt. [Vol.67,p.412]

Tapers may be turned either from the rough bar or from the finished stock in the Model M taper turner. When the taper is turned from the rough bar,



the rolls follow the cutter and when the tapers are turned from finished stock, the rolls precede the cutter.

The unit is provided with adjusting screws, rollers and an adjusting knob for regulating the taper angle by means of a templet. The templet is the same size and shape as has been used on the model K taper turner made by this company.

The rolls are made with one edge slightly chamfered and the other edge ground to a ⅛-in. radius. For very shallow tapers, the sharp corner of the roll is next to the cutter, but when turning steeper tapers the round corner can be used.

The cutter is made from 1-in. square stock and can be adjusted for height by the screw directly under it.

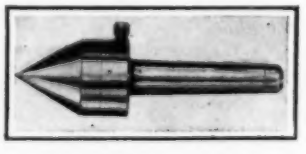
— 137 —

Lathe Center, Heavy-Duty

Snellex Manufacturing Co., Rochester, N. Y. [Vol.67,p.487]

A front ball bearing of larger size than usual is the principal feature of this heavy-duty lathe center. The races are cut deep so that the balls conform almost completely with the grooves to assure ample load-carrying capacity for both radial and thrust loads.

Another feature of the center is the metal packing between the rotating center-point and the tapered sleeve. This packing prevents chips and dirt from entering the ball bearings. The tapered shank is hardened and ground, and the ball bearings



are lapped to alignment with each other for accuracy and reduction of friction.

These centers can be supplied with any taper shank and with any kind of point.

— 138 —

Grinder Attachment for Lathe Tool Post

Atlantic Machine & Tool Co., 28 Canfield St., Orange, N. J. [Vol.67,p.515]

This universal tool post grinder is made with considerable rigidity as regards frame, spindle and bearings. It may be used with equal facility for internal, external and surface grinding.

For surface grinding a cup wheel is used, mounted directly on the spindle. For external grinding the wheel is mounted

similarly, while for internal grinding two extension spindles are provided. The capacity for internal grinding is for holes from ⅜ in. in diam. up.

The spindle is made of hardened, ground and lapped steel and is carried in adjustable bronze bearings. The thrust is taken on a ball bearing. The spindle is driven by a universal ¼-hp. motor at either 3,500 or 5,500 r.p.m. by means of a two-step cone pulley.

The grinder is adaptable to all lathes from 12-in. swing and upward. For surface grinding of larger pieces, it can be mounted in a shaper or planer.

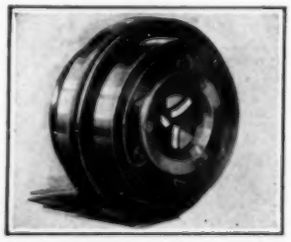
— 139 —

Faceplate, Improved, "Neva-Stop"

McCrosky Tool Corporation, Meadville, Pa. [Vol.67,p.755]

As in the earlier model, the purpose of the improved "Neva-Stop" faceplate is to enable an engine lathe operator to change work on centers without stopping his machine.

The improved faceplate has



three driving jaws instead of two. The body of the faceplate is made from a solid steel disk, and the front plate and guide plate have been materially strengthened. All wearing parts are hardened. The jaws are made from special drop-forged alloy steel.

The improved faceplate can also be furnished with a plain wide collar operated by a single friction brake.

The body portion of the faceplate is left blank, so that it can be bored out and threaded to fit the spindle of the particular lathe on which it is to be used. It is furnished with two sets of jaws for handling work from ⅜ to 2½ in. in diameter.

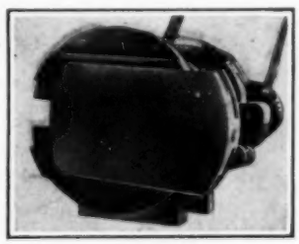
— 140 —

Oval Chuck

Frew Machine Co., 124 W. Venango St., Philadelphia, Pa. [Vol.67,p.869]

Oval or elliptic work can be handled in an engine lathe with the attachment shown. The device can be used for turning punches, dies or similar work for a wide variety of special jobs.

The chuck is set for the required ratio between the two diameters of the ellipse by sliding a block tongued to a stationary piece. One part of the chuck is threaded to the end of the spindle, while the stationary part is bolted to the front of the



headstock. The work can be strapped either to the faceplate or a chuck can be mounted thereon to hold the work.

The chucks are built in three sizes, 12, 16 and 18 in. handling ellipses of the maximum size of 5½x8½ in; 8x12 in. and 10x16 in., respectively.

— 141 —

Chucking Outfit for Hartness Flat Turret Lathes

Jones & Lamson Machine Co., Springfield, Vt. [Vol.67,p.1042]

Standard outfits of chucking tools for the 12-, 15, and 17-in. Hartness flat turret lathes are available for use in handling the general run of work that comes to the ordinary turret lathe. There is a sufficient number of

tools in the outfit to allow a full variety of multiple tooling on complicated work.

The forged tools supplied with the outfit are made of larger sizes than furnished previously. The tool holders are of rigid design and utilize standard tool bits. On the 12- and 15-in. machines, and on the 17-in. machine with a round turret, the tool plate is made in one large ring, rather than in sectors, to increase rigidity. For combination bar and chucking work, however, or where special tools are to be used, the six-part segments will be employed.

Milling Machines

— 142 —

Milling Machines, Improved, Nos. 2 and 3, Milwaukee

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.67, p.253]

Front dial feed control has been added to the Nos. 2 and 3 standard milling machines. By means of a single crank lever

and a direct reading dial, it is possible to instantly secure eighteen changes of feed when the machine is running or idling.

The feed box is located at the rear of the column, and is of the sliding gear type. The dial with the numerals on it revolves with the crank handle, which is mounted on the end of a universal joint shaft.

All the principal parts of the feed box are mounted on ball bearings and forced feed lubrication is provided. In other respects the machine is standard and includes power rapid traverse and Timken bearings.

—143 —

Milling Machine, "Production Type Mil-Waukee-Mil"

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.67, p.449]

The production type milling machine, designated as the Mil-Waukee-Mil, is furnished in two models, the Simplex having one spindle and the Duplex arranged with two spindles. The machines are built of standard units to meet a wide range of requirements. Starting with the plain machine, having but one set of pick-off gears, it can be built up by units until it becomes completely automatic in operation, having a combination of an intermittent table feed, a power rapid traverse, and a spindle start and stop control, as well as quick-change feed and gear boxes.

Other features include a double housing for the spindle block, a double overarm support for the arbor, Timken roller bearings throughout the drive and the main spindle, a planer-type table, automatic flooded lubrication, and a completely inclosed motor-in-the-bed. The top is left clear to permit the mounting of standard or special heads as may be required. Two large reservoirs are contained in the bed, one for the lubrication system and the other for the coolant.

The worktable is 14 in. in width and 92 in. in length. A

power table feed of 48 in. is provided. The table is 32 in. from the floor.

The semi-steel block, carrying the spindle and the double overarms, has a vertical adjustment of 12½ in., while the total cross-adjustment is 8 in. The drive to the spindle is through spiral bevel gears.

A selection of four different ranges of speed is available, with twelve speeds in each range. A selection of two feed ranges is available, either ½ to 20

in. or 1 to 40 in. per min. Each range has eighteen feeds. Operation of the machine is controlled through three control levers centrally located.

The Duplex machine is identical in construction to the Simplex except that the bed is extended beyond the table ways for carrying the second or left-hand head. The distances between the spindle faces are 13½ minimum and 29½ maximum.

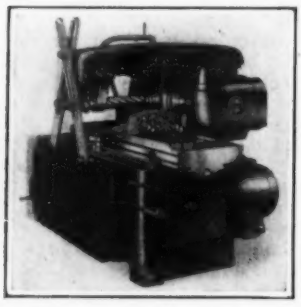
The weight is 8,000 lb. for the Simplex and 10,700 lb. for the Duplex, respectively.

— 144 —

Milling Machine, Automatic, "Giant Hydromatic"

Cincinnati Milling Machine Co., Cincinnati, Ohio. [Vol.67, pp.867 and 919 *Erratum*]

Reciprocation of the table by hydraulic means is featured in the "Giant Hydromatic" milling machine. Among the operating characteristics obtained are reciprocation in either direction at normal feeding rates or at rapid traverse rates; positive control



of the feeding movement regardless of the direction or amount of the resultant cutting force; positive lock of the table in the stopped position; ability for accurate reversal under any cutting conditions; readily controlled acceleration and deceleration of the feed rate during a cut; and economical operation.

These operating characteristics have been obtained by the use of a special combination of pump and auxiliary devices arranged to provide a locked control system.

The hydraulic part of the apparatus consists of a rotor and pendulum of a standard Oilgear pump, a small booster pump of simple construction, a high-grade gear pump, and the necessary control valves. The entire feeding transmission is automatically safeguarded against overload by the action of various relief and control valves.

The spindle drive is from a motor inclosed in the base. All shafts including the spindle are run on Timken roller bearings. The standard Cincinnati, four-bearing self-compensating spindle mounting is featured. The spindle carrier is a self-contained unit in which the whole gear transmission, including the spindle speed change gears are mounted.

The base has been specially designed to take care of the chips, and also the large amount of coolant necessary. The automatic control of the table is similar to the one used on mechanically operated Cincinnati automatic milling machines. Dogs set on the table operate the valves of the hydraulic feed mechanism. Any cycle of milling either a one-way feeding cycle with automatic quick return or a reciprocating cycle automatically controlled for fast and slow feeding in either direction can be obtained.

These "Giant Hydromatic" milling machines are built in plain and duplex machines in a number of sizes varying in table travel from 36 to 72 in. and in table width from 16 to 24 in. The corresponding weights of these machines vary from 9,500 to 18,000 lb.

— 145 —

Milling Machine, Bench, Nos. 3 and 4

Burke Machine Tool Co., Conneaut, Ohio. [Vol.67,p.452]

Two bench milling machines, known as Nos. 3 and 4, respectively, have been added to this company's line. Both machines are motor driven and are the same in size except that one has a hand feed and the other a power feed. In each case a ball - bearing countershaft is furnished driven by a ½-hp. motor.

In the case of the No. 4 power-feed machine, all longitudinal feed is provided on a heavy overhanging arm having graduated dials on both the traverse and vertical feeds.

The knee is rigid and has a solid-top construction. It has a vertical motion of 8 in., while the table has a longitudinal feed of 8 in. and a traverse feed of 3 in. The working surface of the table is 3½x16 in. The overall height of the machine is 25½ in. while the weight is 265 lb. net.

Among the attachments that can be supplied for these machines are a stationary tilting-

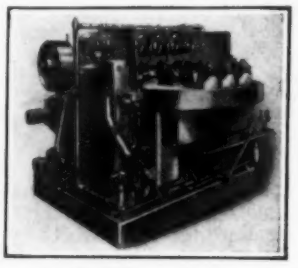
head index center; vertical milling attachment; slotting attachment; draw-in chuck attachment; and plain, swivel-base or quick-opening vises.

— 146 —

Milling Machine, Rise-and-Fall, Improved, Newton

Newton Works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y. [Vol.67,p.74]

The improved rise-and-fall milling machine was recently built for slitting caps and milling bolt bosses on automotive



connecting rods. The improvements were designed to increase production by about 40 per cent.

The spindles are now equipped with Timken roller bearings, and each of the four heads are separately adjustable horizontally to vary the center distance. The table gibs are located in line with the cutters and also in line with the center of gravity of the table in order to give smother feed action and greater rigidity. The gibs are entirely protected.

The table is provided with a vertical Oilgear feed and rapid traverse movement. The length of travel can be varied by adjustable dogs on the side of the knee.

The table is also provided with power indexing movements controlled by a hand lever. Two sets of three fixtures each are mounted on the table so that the operator can load one set while the cut is being taken on another. Care has been taken to provide accurate alignment of the table and saddle units. All bearings are provided with positive means of lubrication.

— 147 —

Miller, Offset, Tilted, 48-Inch

Oesterlein Machine Co., Cincinnati, Ohio. [Vol.67,p.377]

Such operations as face or straddle milling of small parts, the milling of flats, slots and saw cuts may be advantageously applied to this tilted offset miller on a high production basis. Production advance is due to the fact that a number of parts are under cut simultaneously and that 90 deg. of the cutter is active at a time.

In general, the machine consists of a tilted circular table in which there is a large center hole and a spindle mounted beneath and at right angles to the working surface of the table. A 4-in. offset adjustment is provided for the table so that the center line of the table and the spindle may coincide for the removal of the work-holding fixtures or may be offset the distance required to obtain the proper depth of cut.

The spindle is mounted in a slide bolted to the same housing that carries the table. This housing also carries the offset support for the arbor. A vertical adjustment of the spindle of 2 in. is provided. The spindle is mounted on Timken bearings and is driven by a wormwheel. A standard spindle end is used.

The table is 30 in. in diameter and is driven through a large wormwheel. It is mounted in a tilted position in order to shed the coolant. The chips are washed from the table into a retaining cavity in the base. A 10-hp. motor is required.

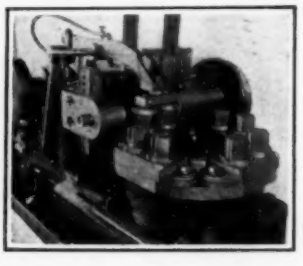
Floor space, 25 sq.ft.; weight, 7,000 lb. net.

— 148 —

Pro-Ducto-Matic, Improved

Bilton Machine Tool Co., Bridgeport, Conn. [Vol.67,p. 635]

Several changes have been incorporated in the No. 40 series of Pro-Ducto-Matic milling machines, in order to make them universal in type. The changes, which include a universal turret, automatic work locating device, quick-changing cutter spindle, reversing drive and changeable cams, are claimed to take the



machine out of the special purpose class and give it as wide a range of use as an automatic milling machine.

By changing the index ring in the turret, any number of indexing stations can be provided for. Three, four and six stations are regularly furnished. The locator blocks on the turret are special for each job. The automatic clamping arm is actuated by a cam at the rear of the machine.

The cutter head can be easily removed, and heads having two or three spindles can be put on for making special cuts. These spindles may be placed in parallel or vertically. A change gear box has been provided so that change of direction of rotation of the cutters can be had by a movement of a lever.

Timken roller bearings are used throughout.

— 149 —

Pro-Ducto-Matic with Two-Spindle Angular Cutter Block

Bilton Machine Tool Co., Bridgeport, Conn. [Vol.67,p.921]

The cutter block and head was designed especially for milling slots in automobile clutch plates working at two different radii simultaneously, but the head can be used for any milling requiring 120-deg. or 60-deg. indexing.

The base, turret, driving shaft and gear box are the same as furnished with the standard machine. The cutter block which

carries the two vertical spindles is arranged for lateral or vertical adjustment on the knee, and each spindle head is independently adjustable. The movement of the head is governed by a cam in the usual way, but two heavy coil springs are provided for balancing the movement of the head. To provide for quick changing, the cams are made in two sections.

The main drive from the gear box operates through spiral bevel gears to the intermediate shaft, which has a worm drive to a wormwheel on the cutter spindle. A special swinging jig for milling clutches swings out for loading and unloading and is locked back in position with one movement of the lever. The starting control for feed is in the front of the machine and other controls are within easy reach of the operator.

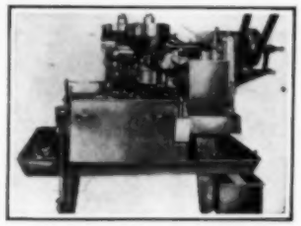
— 150 —

"Mill-Drill-Matic" Machine, Melling

Ampco Twist Drill Co., Jackson, Mich. [Vol.67,p.792]

Four distinct operations of straddle milling, drilling, removing the burr from the drilling operation, and reaming to size, where the drill diameter does not exceed ⅝ in. in steel, can be performed simultaneously on the No. 3 Melling "Mill-Drill-Matic" machine. This work can be performed at one setting with a single operator.

The machine is composed of a work dial that automatically indexes from station to station and locks in position. The mechanism above the dial is comprised of two vertical spindles, one for drilling, the other for reaming, and two milling



units, one for rough milling, the other for finish milling.

The No. 3 machine was developed particularly for automotive yoke end production, but may be employed on any work where the quantity is sufficient.

The No. 1 machine accomplishes the machining of similar parts in smaller quantities. It will straddle mill or face, drill, remove the burr from drilling operation, and ream to size where the drill diameter does not exceed ⅝ in. in steel. The operations are performed in sequence, however.

The No. 3 machine weighs 5,500 lb. and occupies a floor space of 3 ft. 11 in. x 8 ft. The No. 1 machine weighs 4,800 lb. and occupies a floor space of 3 ft. 9 in. x 5 ft. 6 in.

Planers, Shapers and Slotters

— 151 —

Planer, Open-Side, Improved

Cleveland Planer Co., Cleveland, Ohio. [Vol.67,p.397]

Improvements made in the Cleveland open-side planer include the substitution of a single motor on the column, in place of two motors previously used, for the rapid traverse to the heads and elevating and lowering of the rail. A gear box has been substituted for the second motor.

Two additional bearings have also been placed in the gear train: One is an outboard bearing supporting the first driving bevel gear, previously overhung, while the other is an outboard support bearing on the second reduction shaft. The bevel gears are now hardened.

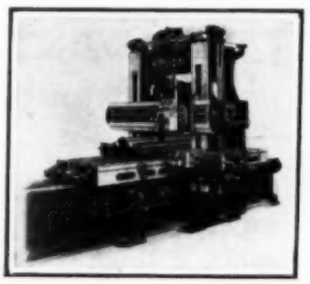
— 152 —

Planer for Contour Work, Hypro

Cincinnati Planer Co., Cincinnati, Ohio. [Vol.67,p.403]

The machine is intended for any kind of irregular outline planing and also for such work as drawing dies and drop forge dies where two or three angles must be matched very accurately. Outlines or sections with very small outside or inside radii can be formed.

The planer itself includes all



the regular features of the Hypro planers. It has a template fastened to the rail back of the slide. This template is a piece of thin sheet brass, which can be easily laid out and embodies the exact profile of the work. On a small attachment back of the slide is the carrier for the tracer.

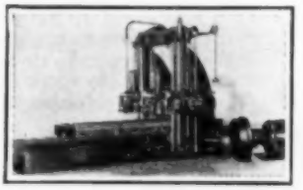
The contact actuates an electrical mechanism which controls the movement of the tool and makes it follow the outline of the template. The electrical control is the regular equipment that the Keller Mechanical Engineering Corporation, Brooklyn, N. Y., is placing on its die-sinking machines.

— 153 —

Planer, Type K, 36-Inch

William Sellers & Co., Inc., Philadelphia, Pa. [Vol.67,p.522]

Modern improvements such as power traverse, dial feed, central lubrication and a single-



lever cross-head locking device have been made to the 36-in. Type K planer. The machine is constructed to withstand heavy cuts and maintain its accuracy and efficiency over a long period of service.

The bed is of box-type construction with one flat and one double V way to take any side pressure. The ways are furnished with an ample supply of oil, which is collected at the ends of the bed and is filtered before being returned to the tank.

The drive is by a reversing motor located at an acute angle to the center line of the bed. There is one herringbone gear reduction between the motor and the main driving shaft carrying the worm. This worm engages a rack under the table and because of the angular position of its shaft, the worm does not develop any side pressure. The table is of box construction and is open at the side for removal of chips.

The uprights are also of heavy box section and the cross rail is of the extended back type. The machine is usually equipped with two heads on the cross rail and a side head on each upright. The saddles and slides have been entirely redesigned. Feed is accomplished by a separate motor with dial control. Ball bearings are provided wherever possible.

— 154 —

Planer for Rail Guides

Cincinnati Planer Co., Cincinnati, Ohio. [Vol.67,p.829]

This machine is designed to plane eight rails, 16 ft. long, at a single setting. The guides are planed on the sides and top and seven cutting tools are required for each rail, making a total of 56 tools at work.

The bed is made twice as long as the table and the Vs of the bed have forced lubrication. The housings are tongued and bolted to the bed and on top are tied together with a box arch. The rail is deep and provided with power movement. The one-piece tool slide is as wide

as the machine and slides on a narrow guide, either at rapid traverse or at the feed rate. A reversible motor, placed on top of the machine, furnishes the rapid traverse movement.

The rear tools are placed on a separate bar that moves simultaneously with the slide and has power rapid traverse and feeds. An automatic tool lifter is supplied to the forward slide and also to the rear tools. Cutting lubricant is supplied to all the tools and when the planer stops, the coolant pump also stops. The coolant is also cut off on the return stroke.

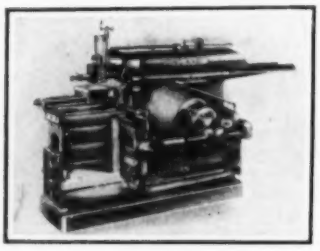
—155 —

Shaper, Rapid Traverse

Cincinnati Shaper Co., Cincinnati, Ohio. [Vol.67,p.210]

Power rapid traverse of the table is now applied to all sizes of shapers from 16- to 36-in. stroke, both of the universal and regular types. The direction of the movement is determined by the feed engagement lever.

The power rapid traverse mechanism is built in as an in-



tegral part of the machine and is driven directly off the drive pulley so that it can be operated whether the ram is running or not. It is driven through the regular feed friction shaft.

An improved ratchet crank has also been added to the machine. The length of the ram bearing has been increased and the overhang of the tool in front of the ram bearing has been reduced. A ram guard has also been added to the rear of the shaper. A single screw vise is now furnished with a flat top accurately ground for use with an indicator or gage. A clamp screw for the tool slide has also been added.

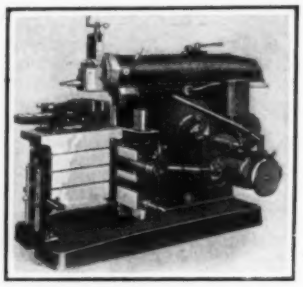
Other features such as automatic oiling, cam feeds, internal transmission, and direct reading controls are retained as in previous models.

—156 —

Shapers, Crank, N. T., 36- and 32-Inch

R. A. Kelly Co., Xenia, Ohio. [Vol.67,p.207]

The types NT and NTR 26- and 32-in. shapers can now be furnished with single-pulley or motor drive.



The ram is of the V-type with full length gib adjustment. The drive of the crank has been improved. The main gear is of semi-steel construction with generated helical teeth and the web is reinforced. The rocker arm is also of semi-steel and of heavy construction.

The cross rail is held to the column by the V-guides. The heavily ribbed dished side wall of the column has been retained, but the crank gear bearing has a separate casting.

Bolted direct to the side of the column is a gear box containing alloy-steel gears, hardened and mounted on multiple splined shafts. The drive is through a friction clutch incorporating a disk brake.

The table is of box construction and has the usual T-slots on both sides and top, as well as a support at the front. The cross feed mechanism has been simplified and a direct reading dial provided to gage the amount of feed.

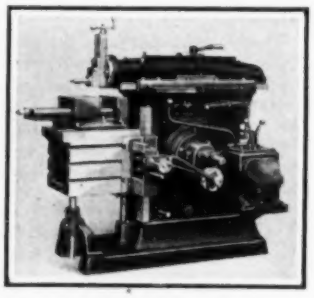
The oiling system is entirely automatic.

— 157 —

Shaper, Crank, 25-Inch

Smith & Mills Co., Cincinnati, Ohio. [Vol.67,p.410]

Improvements incorporated in the 25-in. back-geared, motor-driven crank shaper have also been made in the 16- and 20-in. machines. The shapers are also regularly furnished for belt



drive, either with speed-box or cone pulley.

All gears in the speed box and within the column, and with the exception of the main gear, are of hardened alloy steel. The gears slide on splined shafts mounted on Timken roller bearings. The internal ratchet feed is inclosed within the gear box. A solid feed rod with graduated feed disk is used.

The shaper illustrated is driven by a 7½-hp. motor through a gear box. The drive is transmitted through twin-disk clutch incorporating a self-acting brake. Eight cutting speeds are available through two levers.

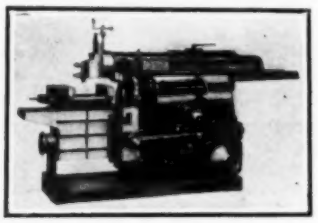
A positive lubricating system supplies all moving parts, including the ram.

— 158 —

Shaper, Crank, Manufacturing

Gould & Eberhardt, Newark (Irvington), N. J. [Vol.67,p. 404]

The shaper is claimed to combine unusual strength and rigidity with speed and power. The features claimed for the improved shaper that places it



in the class of a manufacturing tool, are: Single cam power feed; dual control for table hand feed; power rapid traverse to table at 100 ft. per min.; double crank gear; heat-treated gears; circulatory pressure oiling; anti-friction bearings; rigid and symmetrical frame; chilled ram guideways; rigid work-table guideways; direct-coupled motor; non-slip table support and production vise.

The machine has centralized control for feed changes, feed direction, stroke changes, stroke length, power traverse, and start and stop.

A four-screw tool holder is provided for heavy production work, a single-screw toolholder being optional. A quick-acting block secures the head slide in any position and prevents creeping of the tool.

The pressure oiling system automatically supplies oil to each of the moving and rotating parts, including the ram guide ways and the linkage system.

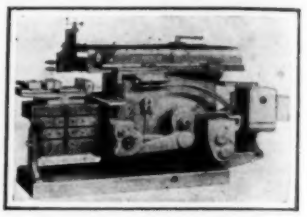
—159 —

Shaper, Improved, 32-Inch

Hendey Machine Co., Torrington, Conn. [Vol.67,p.385]

The machine is driven either by belt or by a motor attached to the base. A gear box provides four speeds, and through back gears the range of speeds is doubled.

All rotating bearings of the machine are either the roller or ball type.



The cross feed movement of the saddle is derived primarily from the shaft of the bull gear through elliptic gearing and a fixed crankpin in the driven gear. The varying velocity of the driven elliptic gear exactly compensates for the corresponding variation of the crank-and-lever movement of the ram, so that the feed always takes place during the return stroke of the ram. The range available is from 0.010 to 0.15 in. per stroke of the ram.

At the bottom of the cabinet is a reservoir to contain the lubricating oil. Used oil drains to this reservoir through a settling basin and is delivered by a geared pump.

The box table has an upper surface of 32x19 in. Planed T-slots and the reamed stop holes are in all sides of the table.

The tool slide is provided with a power down-feed, and the head is adjustable to any angle. The shaper will plane work 32¾ in. long by 34 in. wide by 19½ in. high.

Floor space, 11x5 ft.; weight, 10,600 lb. approximately.

— 160 —

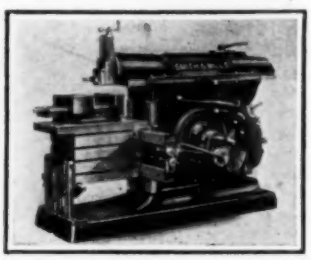
Shaper, Crank, 32-Inch

Smith & Mills Co., Cincinnati, Ohio. [Vol.67,p.672]

The 32-in. back-geared crank shaper is regularly furnished with single pulley drive, having a twin-disk clutch and self-acting brake. Motor drive can be furnished as optional equipment.

The column is heavily box-ribbed and the ramways are also reinforced and have ample bearing surfaces. The box-form construction is also used on the cross rail and the table. The ram has square guides with tapered gib adjustment.

Bolted to the back of the column is a speed box providing four changes of speed, doubled with the back-geared drive. All gears are of the cluster type



made of alloy steel, heat-treated, and are mounted on splined shafts carried on roller bearings. The bull wheel is of semi-steel with cut helical teeth.

The shaper is regularly furnished with a one-shot, hand-operated lubricator.

Weight, 6,500 lb. net.

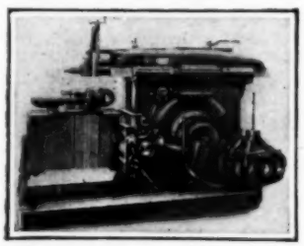
— 161 —

Shapers, Heavy-Duty, Improved

Columbia Machine Tool Co., Hamilton, Ohio. [Vol.67,p.598]

Complete operating facilities and rigidity are featured in the improved line of heavy-duty shapers. A 36-in. stroke machine has also been added.

The machines are regularly furnished with single-pulley or



motor drive with direct gear connection. Cone pulley drive can be furnished on special order. The drive passes through a speed box with single lever control that provides eight speeds in conjunction with the back gears.

Hardened alloy steel gears, ground shafts, bushed bearings and flood lubrication are featured. A friction clutch and brake is placed between the driving pulley or motor and the speed box. The crank or bull gear is a semi-steel casting with cut herringbone teeth.

A patented feed mechanism is used. Eight feeds are provided on the 16- and 20-in. shapers, twelve on the larger sizes.

The shaper is made in six sizes, 16, 20, 24, 28, 32 and 36 in,. with speeds ranging from 9 to 109 strokes per min. in the smallest size, down to 5½ to 76 strokes per min. in the largest. The machines vary in weight from 3,250 to 8,250 lb., net.

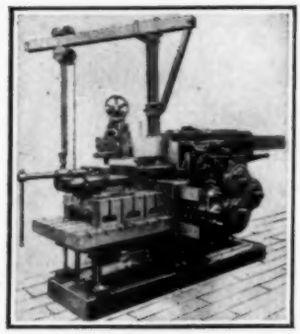
— 162 —

Shaper, Draw-Cut, 60-Inch Stroke, Heavy-Duty

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 67,p.172]

This 60-in. stroke, heavy-duty, draw-cut shaper is manufactured with 36, 48 and 60 in. of horizontal or side feed on the crossrail, and 18 in. of vertical feed.

The regular equipment includes crane and hoist, auxiliary



top table, extra-heavy steel vise, large T-slotted work table, and a set of O. K. tools and holders. The machine can also be equipped with a special tilting vise for particular use on production work on frogs.

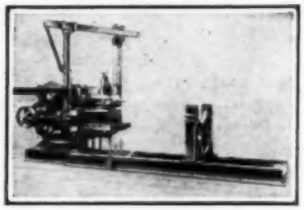
— 163 — —

Shaper, Wabble, Draw-Cut and Roll, Combination, Heavy-Duty

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 67,p.365]

The combined heavy-duty draw-cut and roll wabble shaper is intended to machine the ends of any type or length of roll up to 56 in. in diam. of roll and 28 in. diam. of neck.

The shaper has 48 in. of cutting stroke with 18 in. of vertical feed and can be furnished with 36, 48 or 60 in. of hori-



zontal feed on the crossrail. The general construction and operation of the machine is similar to other heavy-duty draw-cut shapers made by this company. It can be quickly converted to a push-cut shaper for the cutting of pods in rolls.

The machine is equipped with an auxiliary top plate and a heavy steel vise for general work. It is also regularly furnished with a large work table, crane and hoist, a set of O.K. tools and holders and special "V" block for holding the rolls.

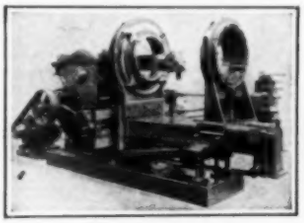
— 164 —

Shaper, Draw-Cut, Heavy-Duty, Special

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 67,p.1035]

A special heavy-duty draw-cut shaper for the production machining of pole pads on cast-steel motor magnet frames is announced.

Four vertical screws are used for raising and lowering the table. The machine has 60 in. of cutting stroke and has



power horizontal and vertical feeds. It is automatically oiled. The motor magnet frames are quickly placed in the special chucks and are rotated by power into position for finishing each of the motor pads.

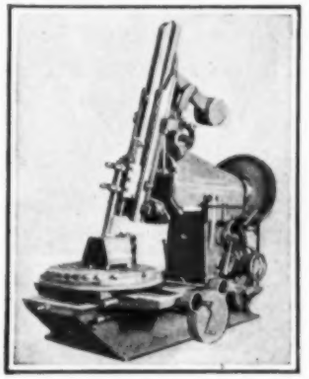
—165 —

Slotter, Traveling-Head, with Angle-Cutting Attachment

Nazel Engineering & Machine Works, Philadelphia, Pa. [Vol.67,p.209]

The Dill traveling-head slotter, of which this company is the manufacturer, has been improved by providing an angle-cutting head, which can be adjusted 15 deg. either side of the center.

The angle-cutting head with a ram and guide forms a separate unit and is fitted on a hub



on the front of the traveling head. Adjustments are obtained through a worm and sector bolted to the angle-adjusting head. The head is indexed in degrees and for accurate adjustment, a dial graduated in minutes is used.

The ram guide is fitted with taper gibs at top and bottom to prevent springing when the cutting thrust is against the gib side.

Presses

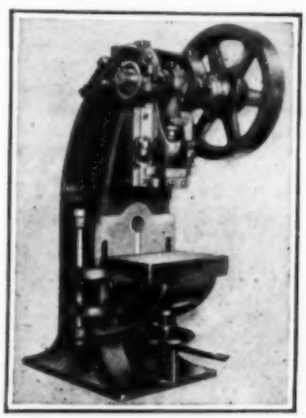
— 166 —

Presses, Horning and Wiring, Adjustable-Bed

Minster Machine Co., Minster, Ohio. [Vol.67,p.170]

An improved series of adjustable-bed horning and wiring presses are available. Due to the large die space, special fixtures can be used. The line comprises six sizes ranging in weight from 1,200 to 9,200 lb., and ram pressures from 12 to 56 tons.

The Nos. 1, 2 and 3 machines are furnished in flywheel type



drive only, while the Nos. 4, 5 and 6 are furnished with either flywheel or back-geared drive. Either belt or geared motor drive can be furnished on all models.

All the frame castings are made of high-grade semi-steel. The bearings are of large diameter and are overhung. Ribs are cast on the inside of the frame and the webs forming the finished section of the back part continue to the top.

For blanking, forming or similar operations a table is provided. It is regularly furnished with the standard bolster plate. This table is hinged to the frame.

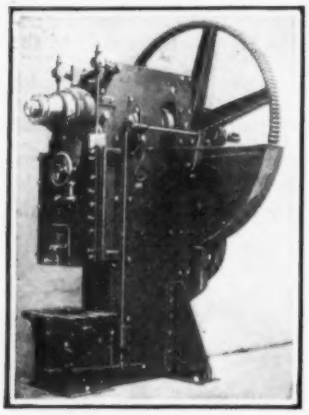
The clutch is of the sliding dog type. A brake is also used to control the crankshaft. All machines are equipped with positive crossbar knockouts in the side, as well. The slide is extra long and adjustment for wear is available.

— 167 —

Press, Plate-Frame, Type Pr, 220-Ton

Henry Pels & Co., Inc., 90 West St., New York, N. Y. [Vol.67,p.411]

The frame of this press is built up of two heavy, high-carbon steel plates connected by



a heavy cast-steel anchor and various separators. The anchor entirely surrounds the throat and serves as a lower platen, ram housing and front bearing for the eccentric shaft.

Individual motor or belt drive can be used in conjunction with a single gear reduction between the flywheel and eccentric shafts. Both platens are large and have T-slots. A large slug hole is left in the bottom platen. The stroke is easily adjustable, but non-adjustable rams can also be provided.

A shear plate is placed between the punch and die, and is so proportioned that if the maximum permissible pressure is exceeded the plate shears and the pressure is relieved.

A foot trip operates the punch and eccentric shaft, but the machine stops automatically after each stroke even should the operator fail to remove his foot. The clutch used has three jaws. A lock pin eliminates shock, and a safety pawl on the clutch protects the gear and other members from damage. A brake band is used to stop the ram in its highest position.

Floor space, 96x112 in.; height above floor, 148 in; weight, 19,250 lb. net.

— 168 —

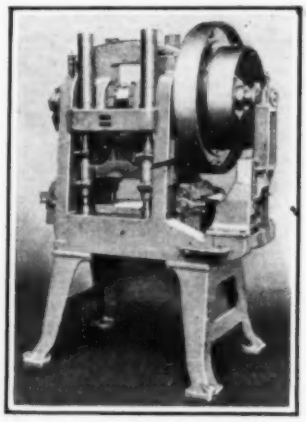
Press, Blanking, Four-Post

Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.67,p.391]

The four-post, high-speed blanking press is intended for blanking from the strip or for cutting or forming with follow tools on a high production basis.

The features claimed for the machine are: Accurate gate guide alignment with bearings above and below the tools; shock-absorbing flywheel; a friction mechanism that exerts no friction except when stopping the press; tools that work in full view; double-gate solid connections that eliminate strain on threaded parts; lifter springs to take up backlash in connection bearings; adjustable roll feeds, vertical roll adjustment and spring shock release in the roll feed connection.

The machines are built in three standard sizes, having capacities of 20, 40 and 60 tons. The frames are designed to



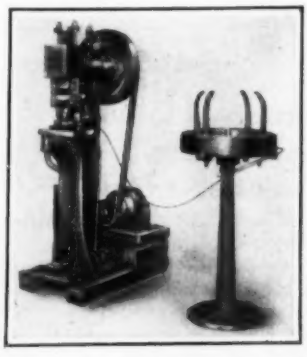
facilitate the application of special attachments or to permit changing to individual geared motor drive. The weights are 2,300, 5,000 and 7,600 lb., respectively.

— 169 —

Presses, High-Speed

E. W. Bliss Co., Brooklyn, N. Y. [Vol.67,p.680]

This type of press operates over a range of about 400 to 600 strokes per min. Since at high speeds one of the limiting



factors is the clutch, in this press the shaft and clutch operate at only one-third the speed of the slide. The slide is actuated by a three-lobed cam on the driving shaft.

When this equipment is furnished on the "Bliss-Stiles" type punch presses, the slide may be stopped at every third stroke. On the "Bliss N-Line" presses, the clutch control can be arranged to permit stopping and starting on any stroke of the slide. The strokes range from $\frac{3}{8}$ in. on the small sizes to 1 in. on the larger sizes.

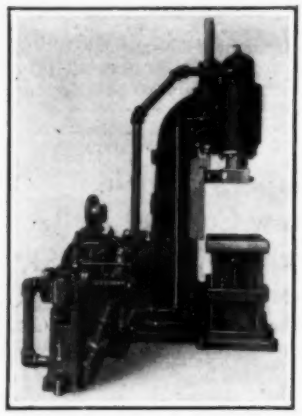
Special light feeds of both single- and double-roll types for punching and shearing work are used on these machines, but are limited in stroke and application by the speed of the operation. This type of press can also be fitted with suitable indexing feeds and can be applied to armature disk notching.

— 170 —

Press, Staamping, Hydraulic, "Hi-Speed"

Hydraulic Press Manufacturing Co., 20 E. Broad, Columbus, Ohio. [Vol.67,p.675]

Forty-two normal working strokes per minute can be obtained on the H P M "Hi-Speed" hydraulic stamping press. The press is flexible enough so that it can be used on deep drawing and on other work re-



quiring any stroke from a fraction of an inch up to 18 in. It also operates over a wide range of pressures.

The working parts consist of the main ram, and the auxiliary differential pull-back ram. Both pieces have straight-line motion only. The tool holder construction follows standard practice.

The bolster plate is mounted on a removable sub-table which has a central U-opening so that hydraulic cylinders or other devices for operating ejectors and the like can be placed below the bed.

The power unit consists of an electric motor direct-connected with two rotary hydraulic pumps mounted on a reservoir base. When the treadle is depressed, the press closes at fast speed, shifts to the slower full-load speed, reverses the direction of the press travel when the limiting pressure is reached, returns to its initial position and stops. Manual control may also be applied.

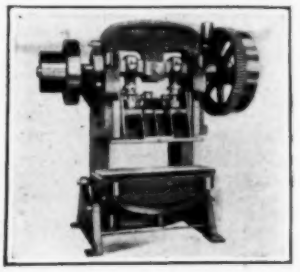
The bolster plate measures 30x22 inch.

— 171 —

Presses, Inclinable, Open-Back

Minster Machine Co., Minster, Ohio. [Vol.67,p.878]

Three sizes of double-crank, open-back presses designed for strength, variety of operation, and continuous production are available. These presses have ram pressures of 32, 45 and 56 tons, respectively, while their



weights range from 5,300 to 13,000 lb. All three sizes can be furnished either with a flywheel or with a back-gear drive.

The gap has been made deep, and the opening in the frame wide to facilitate feeding of work either from right to left or front to back. Adjustment of the inclination of the press is obtained by means of two telescopic screws. The frame casting is well reinforced, and a high-grade semi-steel is used. Tie-rod lugs are cast on the frame so that steel tie rods may be used to increase the rigidity of this member, if required.

The crankshaft is made of high-carbon hammered steel. The slide is flanged.

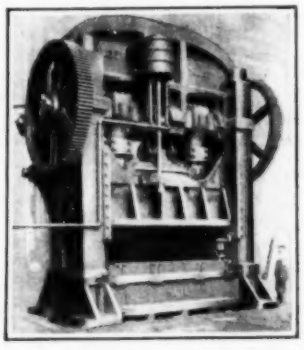
— 172 —

Press, Double-Crank, Large-Size

E. W. Bliss Co., Brooklyn, N. Y. [Vol.67,p.879]

The double-crank press shown has a complete weight of over 600,000 lb. The crankshaft is 16 in. in diam. at the bearings, and 19 in. diam. at the pins.

The entire working strain is taken by four large steel tie



rods which tie together the bed, crown, and uprights. The uprights serve to carry the weight of the shaft, gearing, crown, and slide. The bed weighs 60 tons, and is of cambered construction. The crown weighs 58 tons, while the slide weighs 34 tons. The slide is counterbalanced by two air cylinders attached to it. The front and rear adjustment of the slide is made by means of a 15-hp. motor. The machine is twin-driven.

The stroke of slide is 15 in., area of slide face 60x148 in., area of bed 60x160, and opening in bed 48x148 inches.

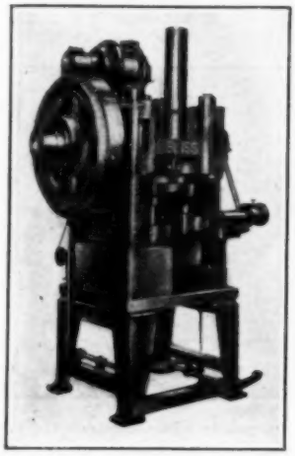
— 173 —

Punch Press, High-Speed

E. W. Bliss Co., Brooklyn, N. Y. [Vol.67,p.1034]

The press operates at 300 strokes per min. and was designed particularly for punch-press work.

The press is built with a massive frame, keyed in alignment and tied together with oversize tie rods shrunk in the housings under an initial tension



in excess of the rated load of the machine. The frame, bed, crown, and shaft are of such ample size that deflection under load is reduced to a negligible amount.

The strokes of this press are kept short in order to keep down the working velocity of the punches. All moving parts are compact and their weight is counterbalanced by long compound springs. This type of machine is made for only one class of work, largely blanking, and large adjustment is not provided.

The machine is fitted with a standard Bliss high-speed rolling key clutch. The brakes used are of the intermittent type and are free while the press is running.

Any opening desired can be provided on the bed to drop the work straight through. The working parts are all on top.

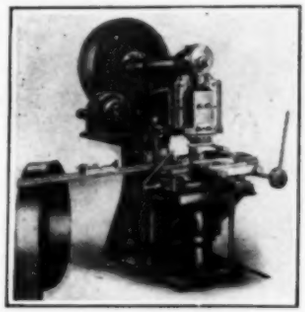
Mechanical feeds of several types can be furnished, including single- and double-roll feeds driven continuously or intermittently, magazine feeds, and the like.

—174 —

Press and Nibbling Machine, No. P-25½, "Semco," Improved

Service Machine Co., Elizabeth, N. J. [Vol.67,p.1035]

In order to provide a machine for handling the heavier gages now used in the fabrication of



sheet metal, several improvements were made to the No. P-25½ punching press with a capacity of 30 tons pressure near the bottom of the stroke.

The gap in the housing or throat is 20 in. deep from the center of the slide, and the slide has an up and down adjustment of 3 in. to take care of the range of ordinary die sets. Where required, a positive knockout can be incorporated in the slide.

The bed, which is 16x24 in. in area, is a separate knee casting adjustable in height to provide die space varying from 6 to 14 in.

The universal nibbling table is a separate attachment and is removable. It consists of three parts, a lower casting bolted to the press bed, a middle section that slides forward and back, and a top table that has lateral traverse. Four-way adjustable gages and adjustable clamps are used to obtain quick and accurate setting of the work.

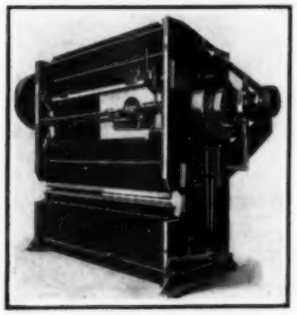
The nibbling machine requires only the making of a template having the desired opening. This template is clamped in the front extension of the table, the gages are set, and the work is run through at an average rate of three pieces per minute.

—175 —

Press, Forming, Steel

Dreis & Krump Manufacturing Co., Chicago, Ill. [Vol.67,p.252]

This series of all-steel forming presses is of the single-housing type, rigidly constructed throughout with the housings, ram and bed made of steel plate to prevent breakage. The gears are also made of steel, while the eccentric strap, knuckle bearings and gibs for the slides are semi-steel castings. The eccentrics themselves are forged steel.



The flywheel has a clutch attached and runs on Timken roller bearings. The clutch is of the multiple-disk type and is engaged by a treadle. The clutch incorporates a brake that stops the ram instantly at any desired position.

Automatic lubrication is provided by sight force feed oilers. Adjustment of the ram is obtainable by an independent motor. Allis-Chalmers Texrope drive connects the driving motor to the flywheel.

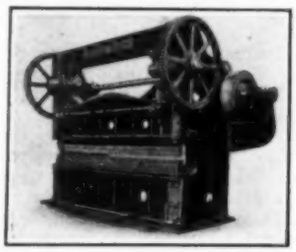
— 176 —

Press Brake, Open-Throat

Long and Allstatter Co., Hamilton, Ohio. [Vol.67,p.714]

The housing, slide and base in this open throat press brake are made of annealed steel castings of ample proportions to take care of all possible loads.

The clutch has been designed to transit the entire driving power, yet is flexible enough to prevent breakage of the machine in case of overload. The slide can be stopped at any part of the stroke as the clutch is



easily disengaged and at the instant of release a brake is applied. The slide may be adjusted by a small motor mounted on the rear.

Motor drive is by belt to the flywheel, but Texrope or any other type of drive can be furnished, if desired. The flywheel is mounted upon Timken roller bearings. The power is transmitted to the cam shaft through steel gearing.

The press brakes are made in eleven sizes ranging from 6 ft. 6 in. to 14 ft. 6 in. between housings. The standard stroke in all cases is 3 in. and the slide adjustment is 6 in. The speed of stroke is between 25 and 30 strokes per minute.

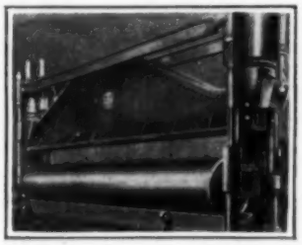
— 177 —

Forming Press for Boiler Shells

Wickes Boiler Co., Saginaw, Mich. [Vol.67,p.833]

The large hydraulic press shown was designed for use in forming boiler shells. The press has an open span between posts of 30 ft., and is capable of producing a pressure of approximately 3,000,000 pounds.

The machine was originally



designed for flanging wide boiler heads and for forming butt straps and the ends of the shell plates to the proper curvature in a single operation. It was later modified for use in pressing a drum shell from a single plate.

In order to accomplish this purpose, a large forged-steel stake or mandrel with special attachments for handling was applied to the press. The mandrel is 36 in. in diam., and weighs over 100,000 lb. It is made of an alloy steel of high tensile strength. Cast-steel forming dies rest on the lower platen of the press.

— 178 —

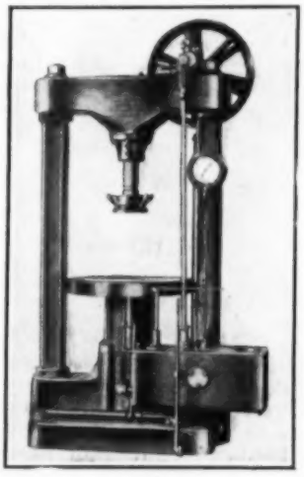
Hydraulic Press, 60-Ton, Vertical, No. 727

Defiance Machine Works, Defiance, Ohio. [Vol.67,p.1031]

For general-purpose use in pressing objects together where a stroke of ram not to exceed 8 in. is required, No. 727 vertical 60-ton hydraulic press was developed.

The frame consists of a heavy cored base, crosshead and two squared columns. The crosshead at the top of the machine is held in place by two stay bolts leading from the base and through the column to the head. The head supports the drive mechanism and is fitted with a square thread screw 4 in. in diam. with 22 in. of travel.

The lower end of the screw is capped with a pressure block with handles for adjustment. The maximum distance from the top of the table to the head



of the screw is 22 in., while the minimum distance between columns is 29½ in. The working surface of the rable top is 28 in. in diameter.

The hydraulic pump is of the double-acting type and is placed in a tank fastened to the base. An adjustable safety valve can be set to release the force at any desired pressure within the given capacity.

The ram is 8 in. in diam. and has a maximum vertical movement of 8 in. A 5-hp. motor is required to drive the unit.

Floor space, 55x40 in.; weight, 3,500 lb. net.

Shearing and Punching Machines

— 179 —

Shear, Punch and Coper, Combination

Joseph T. Ryerson & Son, Chicago, Ill. [Vol.67,p.561]

In this combination machine four single tools are incorporated for punching structural shapes, plate and bar shearing, angle and T cutting, angle and T mitering, coping and notching.

The punch is capable of handling a wide variety of struc-

tural shapes. The frame at this point has a 15-in. throat.

The angle shear attachment handles both inside and outside miter cutting as well as straight shearing. The plate shearing blades handle plates up to ½ in. in thickness.

The coping device is extended out from the frame and is located at a convenient height. It is regularly furnished in the V-notch type but the square notch can also be provided. The machine will shear round bars up to 1¾ in. in diam., square bars up to 1½ in., angles up to 4x4x⅞ in., flat bars up to 6x⅝ in., and notches in 3x3x7/16-in. angles and Ts.

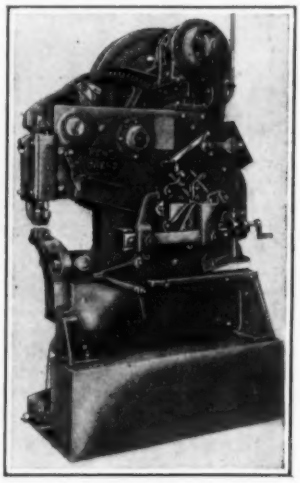
Weight, 5,100 lb. net.

— 180 —

Iron and Steel Worker, All-Purpose

Kent-Owens Machine Co., Toledo, Ohio. [Vol.67,p.881]

The various tools provide for punching, cutting and mitering of sections, shearing of round



and square barstock and shearing flats and plates. A simple attachment also provides for coping and notching.

The side members of the frame are rolled from special analysis open hearth steel, and are electrically welded to intermediate forgings placed and shaped so as to give maximum rigidity.

The punch is full floating and has an adjustable stroke. The bar cutter has an adjustable hold-down plate. Interchangeable upper and lower steel knives having four cutting edges each, are used in the shear. Large clearance in the shear ways is provided.

The capacities of the unit is for holes 1 in. in diam. in ½-in. plate; angles up to 4x4x⅞ in. square, and up to 3x3x½ in. at 45-deg. angle; rounds up to 1⅛ in. and squares up to 1¼ in.; plates up to ½ in. in thickness.

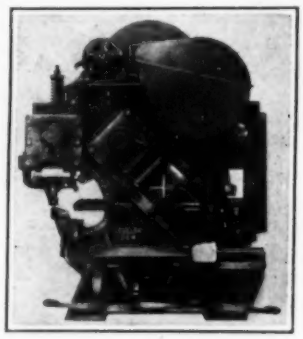
The machine may be arranged for motor drive. Steel cut gears are used in the driving mechanism.

— 181 —

Punching and Shearing Machine, Combination, No. 2

Cleveland Punch & Shear Works, Cleveland, Ohio. [Vol. 67,p.751]

Punching, notching, shearing and splitting can be performed on the No. 2 combination machine. An attachment is also supplied for twisting bars. All



the working parts are readily accessible. Three men can work on the machine at the same time.

The frame is made of solid cast steel, and the drive is through gears of wide face.

A single or triple punching attachment may be used. Interchangeable triple gag attachments are also furnished so that three sizes of holes may be punched in various gages at one set-up. An internal notching attachment is also furnished. Each unit is individually operated by means of 4-jaw clutches.

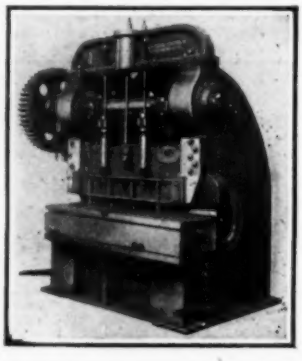
With this machine, I-beams, 4 to 15 in., and columns, 4 to 8 in. inclusive, can be punched in either the flange or the web, while holes up to 1 1/16 in. in diam. can be punched in ⅝-in. plates. The notching capacity is 6-in. I-beams, 8-in. channels and 2x2x¼-in. angles. Angles and Ts up to 4x4x½ in. can be squared off or similar sections up to 3x3x½ in. can be sheared at 45 deg. I-beams and channels of 6 and 9 in. respectively can also be sheared, and plates up to ⅝ in. can be split.

— 182 —

Squaring Shears, Improved

Long and Allstatter Co., Hamilton, Ohio. [Vol.67,p.333]

There is now furnished as a standard feature on the No. C size squaring shears and smaller, an improvement that allows one end of the blade to remain open a little more than the thickness of the material being sheared, so that a sheet longer than the blades themselves can be cut in two stages without nicking or tearing in the first pass. In this way it is said it is pos-



sible to cross-cut the full width between the housings or to slit any length without change of the blades, so that considerable time is saved in such operations.

—183 —

Shear, Angle-Iron, No. 62

Whitney Metal Tool Co., Rockford, Ill. [Vol.67,p.213]

The No. 62 angle-iron shear is similar in appearance and employs the same working principle as this company's No. 4 angle-iron shear, except that it

is heavier. The capacity is for 3x3x1¼-in. angle irons or lighter.

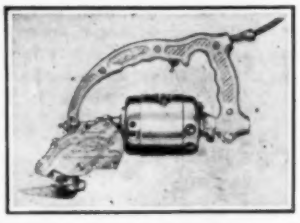
The shear has an eccentric gear to equalize the leverage. An adjusting screw is provided so that angles can be cut off square. A self-clamping pad is used to hold the work in position and a flat bar handle is used to operate the shear. All wearing parts are hardened throughout. The inserted blade is made of tool steel.

— 184 —

Unishear, "Mighty Midget"

Unishear Co., Inc., 270 Lafayette St., New York, N. Y. [Vol.67,p.713]

The same cutting action as used on the larger machines is employed in this light-weight portable power cutting shear. The tool has a capacity for cutting sheet iron up to No. 18



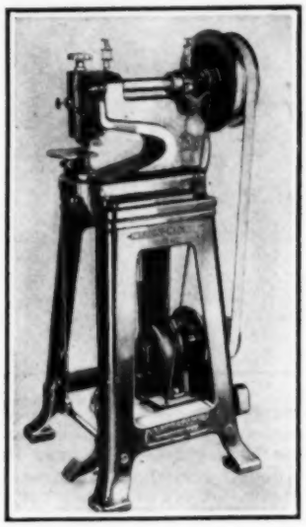
gage, aluminum or brass up to No. 16 gage and soft materials in proportion. The minimum radius that can be cut is 1 inch.

The unit is driven by a ¼-hp. universal electric motor, which operates from any lamp socket at either 110 or 220 volts. The

motor, through gearing and a crank mechanism, transmits oscillatory movement to the upper shear blade.

The lower shear blade is stationary and is mounted on a yoke, which is pivoted to vary the blade clearance. The blades are made of heat-treated Poldi steel and can be readily removed for resharpening. With the motor operating at full speed, about 2,000 cutting strokes per minute take place.

A pivoted duplex handle provides a convenient grip for holding the unit. It can be swung into any position and locked in place. For bench use, a cradle is supplied to hold the unit with the yoke uppermost. The operator then pulls the material through the blades.



— 185 —

Nibbling Machine, No. 1-A

Andrew C. Campbell, Inc., Bridgeport, Conn. [Vol.67,p.392]

The throat of the No. 1 machine has been increased to 12 in., and the machine has been designated as the No. 1-A size. It was primarily adapted for duplication of small quantities of production parts and the making of templets, ornamental work and the like. At its rated speed of 550 strokes per min., the machine will cut $\frac{5}{16}$ in. stock at 28 in. per minute.

For drive the machine requires a ½-hp. motor which can be mounted in the lower part of the frame. The machine occupies a floor space of 1 ft. 11 in.x2 ft. 6 in. and is 4½ ft. high. The net weight of the belted model is 490 lb. The equipment includes a circular cutting attachment, double-end punches ¼ in. in diam., three dies and the necessary wrenches.

Threading Machines

— 186 —

Tapping Machines, Automatic, High-Speed

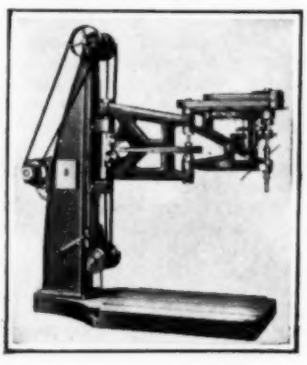
Hammond Manufacturing Co., Cleveland, Ohio. [Vol.67,p.249]

These automatic tapping machines were designed to perform drilling, tapping, stud, and nut and screw-driving operations. The hinged arm feature of the Hammond radial drilling and tapping machine has been retained.

The machines are furnished in a radial type with T-slotted base, in a wall type, and in a pedestal type.

In the radial units the countershaft is integral with the machine and may be driven through a friction clutch or from a self-contained motor. Ball or roller bearings are used throughout. The pedesta' type of automatic tapping mac..ines has the same spindle driving and reversing mechanism as the radial machines and can be furnished with either self-contained motor drive or with a clutch pulley mounted on the countershaft.

Both machines have a capacity of $\frac{3}{4}$-in. drills, $\frac{5}{8}$-in. taps, and $\frac{7}{16}$-in. studs. The working surface of the base of the radial machine is 34x48 in., while the working surface fo the table of the pedestal type machine is 16x20 in. The shipping weights are 2,500 and 1,000 lb., respectively.

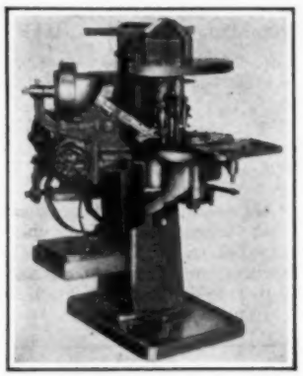


— 187 —

Tapping Machine with Automatic Screw Inserting and Staking Devices

Anderson Die Machine Co., Bridgeport, Conn. [Vol.67,p. 387]

In applying binding screws to electrical apparatus, it is necessary to tap the hole, insert the screw and rivet or stake over the end after insertion. These three operations have been combined, in the dial feed tapping machine shown, by applying a hopper for feeding the screws automatically, a screwdriver for driving the screw to the desired tension, and an automatic staking tool. One, two or three holes, either in the same plane or in different planes, can be handled in the machine at a speed of about 40 pieces per minute.



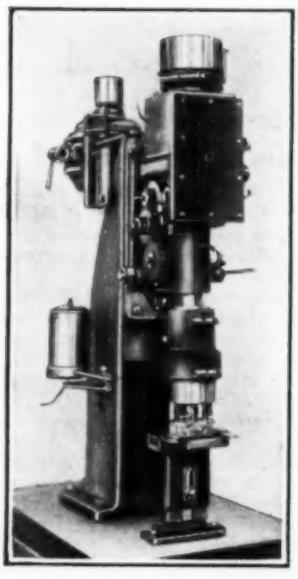
The hopper is made to feed screws from No. 3 to No. 10 in size. The screwdriver is provided with a friction clutch device, by means of which the torque exerted by the screwdriver can be adjusted to suit requirements. The staking tool also is so constructed that the blow can be regulated.

— 188 —

Tapping Heads, Automatic

Langelier Manufacturing Co., Providence, R. I. [Vol.67,p.372]

This automatic tapping head is intended to be used in conjunction with automatic machines on mass production or individually upon jobs, the magnitude of which does not warrant the construction of elaborate special machines. Each head is mounted on a column that is adaptable to it. The drive is by belt, from a motor mounted upon the column or from an overhead lineshaft.



The mechanism to rotate and reciprocate the spindle is all contained in the upper casing while the tapping heads, containing any number of spindles disposed in any desired geometric pattern, are interchangeable in the lower holder.

The reciprocating motion of the spindle is derived through a racket-and-pinion movement, giving positive lead control. The cycle may be continuous and entirely automatic, or it may be set to go out of action upon completion of each stroke.

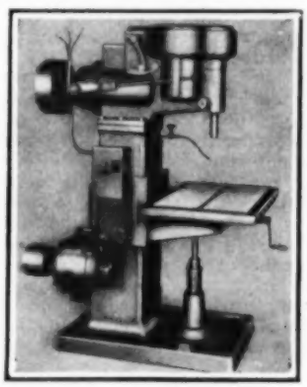
These mechanisms are now available in three sizes: No. 12 size is for taps from $\frac{1}{16}$ to ¼ in., 48 to 18 pitch; No. 22, for taps $\frac{1}{16}$ to ½ in., 36 to 12 pitch; and No. 32 for taps ¼ to ⅝ in., 24 to 8 pitch.

— 189 —

Tapping Machine, Oscillating, Pneumatic, No. 10

W. Gaterman Manufacturing Co., Manitowoc, Wis. [Vol.67, p.406]

Improvements have been made to the pneumatic oscillating tapping machine including a box-type construction, six-speed geared transmission, and the use of sub-assembly units. All operating parts of the machine are housed within oil-tight housings and are lubricated by a bath of oil.



All radial and thrust loads are carried on Timken roller bearings, of which twenty-two are used.

The speed change transmission and the forward and reverse-clutch transmission are built as separate units and are inserted into the head of the machine as a complete assembly to enable adjustments or repairs to be made easily.

The capacity of the machine

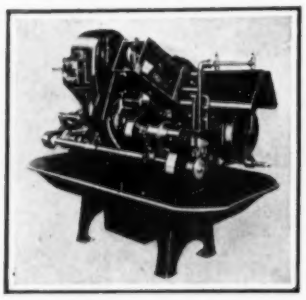
is from ¼ to 1¼-in. and the weight is 1,500 lb. approximately.

— 190 —

Threading Machine, Double-Spindle, Automatic

Rickert-Shafer Co., Erie, Pa. [Vol.67,p.405]

Standard 1-in. pipe nipples can be threaded at the rate of 13 ends per min. on the type R-S automatic double-spindle threading, or second-operation, machine. The production rate on other sizes of pipe nipples varies up to 25 ends per minute for ⅛-in. pipe. With slight



modification, the machine can be adapted for the threading of other parts.

In general, the unit consists of two threading spindles automatically controlled by cams, and an eight-station turret mounted in a vertical plane. The turret indexes automatically in time with the spindle movements. For threading nipples, the turret is equipped with an automatic air-operated collet to hold the work.

The cam controlling the actual motion of the spindle gives quick advance, slow cut with positive lead control, and rapid return. Two pieces are threaded at once, and the turret indexes two stations at a time. Air control is used to lock the turret in each position by means of an indent pin.

Drive from a 3- to 5-hp. motor through a silent chain is usually recommended, but belt drive can also be furnished.

— 191 —

Threading and Tapping Machines

Mitchell Engineering Co., Springfield, Ohio. [Vol.67,p.525]

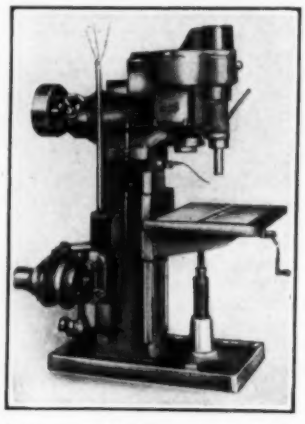
This company recently purchased the complete line of threading and tapping machinery formerly manufactured by the Webster & Perk Tool Co., of the same city. This line consists of multiple-spindle horizontal threading and special tapping machines, automatic die-type threading machines, and vertical nut-tapping machines. The present manufacturers are in a position to handle repairs and replacements for any machines furnished by its predecessors.

— 192 —

Tapper, Oscillating, Pneumatic, Improved No. 10, Heavy-Duty

W. Gaterman Manufacuring Co., Manitowoc, Wis. [Vol.67, p.639]

By making a few modifications and strengthening certain parts, this company has increased the capacity of its No. 10 heavy-duty pneumatic oscillating tapper described under Item 189 of this review. The improved model has a capacity from ¼ to ¾ in. U.S.S. taps in steel with the regular speed



changes and from ½ to 1½ in. U.S.S. taps in steel, when back geared.

The weight of the unit has been increased from 1,500 to 1,650 lb. It still retains the prominent features of the former model such as six-speed transmission, the employment of 22 Timken tapered roller bearings, splash and force feed lubrication to all high speed parts, together with complete inclosure for all moving parts.

— 193 —

Thread Milling Machine, Improved

Waltham Machine Works, Waltham, Mass. [Vol.67,p.870]

The machine is furnished with a cabinet base or in a regular bench model.

The work can be held either by a spring chuck, jaw chuck or on centers. The cutter head is mounted on an angle iron and may be swiveled horizontally as well as vertically.

Sixteen changes of speed for the work are provided. A simple indexing device is attached to the work spindle and an index with twelve divisions is furnished for miscellaneous work.

For relieving taps of multiple-

threading cutters, the regular work head is replaced by one that carries a cam mounted on a shaft geared to the work spindle. A set of change gears provides for milling any number of lands from 3 to 10 inclusive, and by means of extra gears all divisions from 11 to 20 may be obtained.

The regular work drive is through a worm and gear on the work headstock and is satisfactory for a lead of ½ in. or shorter. For longer leads it is necessary to apply the power through a lead screw.

The machine is best adapted for work 2 in. in diameter.

— 194 —

Bolt Pointer and Threader, Combination, Automatic

Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.67,p.364]

In the automatic bolt machine illustrated, the pointing is done with a box tool, and the threading with a standard die-head of

any specified commercial type. The blanks are fed from a rotor hopper down an inclined chute to the operating position. The machine can be easily arranged for belt drive or for individual motor drive.

The machine illustrated has a capacity for ⅜-in. bolts, ¾ to 6 in. long under the head. It will thread up to within ¼ in. of the underside of the head, and will cut a thread 2¼ in. long. The cutting speeds range from 25 to 45 ft. per min., and the production is from 360 to 2,000 bolts per hour. This machine occupies a floor space of 73x40 in. and weighs 3,250 lb. Other sizes of machines can be had for handling bolts of any specified size.

— 195 —

Bolt Former and Threader, Automatic

Landis Machine Co., Waynesboro, Pa. [Vol.67,p.1029]

The machine has a capacity for bolts ⅛ to ¾ in. in diam., 1 to 6 in. long under the head, and with a 2¼ in. max. length of thread. The bolts are automatically fed from a hopper, conveyed to the grips at the loading station, indexed to the equalizing and pointing station, then to the threading station and

back to the loading station, where they drop from the grips into a bolt-collecting compartment, separate from the chips. The operations of equalizing and cutting to length, and threading are automatic.

The turret chuck has three stations, one for loading and unloading the bolts; one for cutting to length and forming the end of the bolt; and one for threading. In order to secure full thread at the start, accurate lead and minimum taper, the design incorporates an arrangement through which control of pressure as the die takes hold of the bolt is made the equivalent of the hand control exercised by the skilled operator.

Other details of design include: A single set of cams covering the entire range of the machine; speed of threading head controlled by change gears; automatic safety devices; location of the threading head at the front of the machine where it is screwed to the nose of the spindle; accessibility of the forming head with the turret in its lowest position; mounting of spindles in anti-friction bearings; and centralized lubrication wherever possible.

Power is transmitted to the main driving shaft by means of a short belt from a motor in the base. The machine can also be arranged for a single-pulley drive.

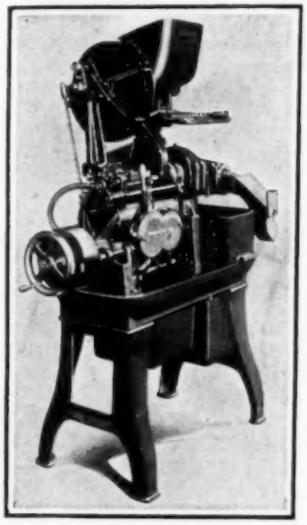
Floor space 40x68 in.; weight 4,700 lb. net.

— 196 —

Nut Threader, Automatic

Automatic Nut Thread Corp., 24 W. Tupper St., Buffalo, N. Y. [Vol.67,p.370]

The automatic nut-threading machine of the continuous tapper type uses a bent shank tap and is intended for high production work. It has a capacity for tapping hexagon or square nuts from $\frac{5}{16}$ in U.S.S. to $\frac{1}{4}$ in. S.A.E. sizes.



The machine is fully automatic with hopper feed, and has a recommended production speed of 15 U.S.S. nuts and 10 S.A.E. nuts per minute. The machine is equipped with a single clutch pulley drive and an automatic safety clutch throwout.

Ball bearings are installed throughout and all bearings and gears are inclosed and run in a bath of oil. The hopper is of the rotary drum type. It is claimed that the machine is easily changed from one size of nut to another.

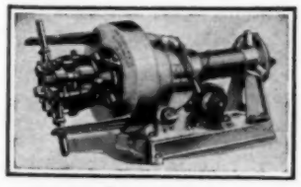
— 197 —

Pipe Threader, Portable, 4-Inch, "Power Boy"

Oster Manufacturing Co., Cleveland, Ohio. [Vol.67,p.36]

The 4-in. portable pipe threader shown is designated as No. 414 "Power Boy." It is built of aluminum alloy and weighs 380 pounds.

The driving power is furnished by a $\frac{1}{4}$-hp. universal motor that will operate on any 110-volt circuit. A two-speed transmission is provided with a lever shift.



The pipe is held stationary in a 3-jaw self-centering chuck, and the pipe tools are turned by the driving arm. The machine will handle all sizes of pipe from $\frac{1}{8}$ to 4 in., nominal size, and will drive geared die stocks from $4\frac{1}{2}$ to 12 in. by means of an auxiliary drive shaft. Any square-end or roller-type pipe cutter of 2 in. capacity can also be driven.

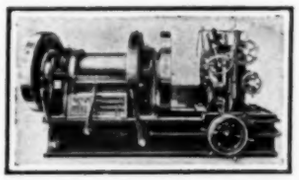
— 198 —

Pipe Threading and Cutting-Off Machine, 16-Inch

Landis Machine Co., Waynesboro, Pa. [Vol.67,p.368]

This machine has a range from 8 to 16 in. inclusive with one die head and one set of chasers. The carriage travel of the machine is 25 in. and it has eight speeds.

The gear box is located beneath the main spindle, and all



gears are of steel and are run in an oil bath. The shaft bearings are lubricated by a forced feed system.

The cross-rail supports the diehead and is fitted with centering jaws, cutting-off tool and reaming tool, which can also be employed for chamfering. The die lubricating system includes a rotory pump, a by-pass for the surface oil, and a special control valve.

Motor drive can be applied after the machine is in service. A 20-hp. constant-speed motor is required.

Floor space, 6 ft. 2 in. x 11 ft. 6 in.; weights, belt drive 16,900 lb., motor drive 18,000 lb.

— 199 —

Tap Holder, Safety, Friction, "Wizard"

McCrosky Tool Corporation, Meadville, Pa. [Vol.67,p.794]

This "Wizard" safety friction tap holder is designed to prevent tap breakage on machine tapping. The holder enables the operator to drive the tap to its full capacity all the time. As soon as this point is passed, or the tap meets an obstruction, sliding takes place.

There are only five parts including the bushing that holds the taps. The plug that receives the bushing is tapered both

ways. Each taper fits into a fiber-lined cup and a differential nut draws the lower cup towards the upper one to increase the friction.

The bushing is driven by two keys and floats in the holder. It is held in place by a ball and spring retainer, which functions as a safety device.

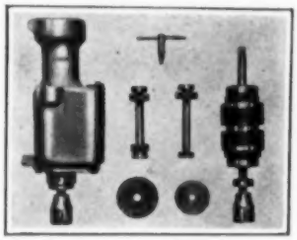
The holder and bushing are made in three different sizes handling taps ranging from $\frac{1}{16}$ to $1\frac{1}{4}$ in. and pipe taps from $\frac{1}{8}$ to 1 in. Special bushings for taps with special shanks can also be furnished.

— 200 —

Friction Tapper

Fosdick Machine Tool Co., Cincinnati, Ohio. [Vol.67,p.1041]

The patented friction tapper has been designed for the high-speed sensitive drilling machines made by this company. It is applied to the lower end of



the spindle sleeve. With this mechanism it is possible to tap to the bottom of holes without danger of tap breakage, even though the holes should vary in depth.

The forward and reverse mechanism consists of two sensitive, but powerful self-adjusting, multiple-disk frictions running in oil. Downward pressure of the feed lever drives the tap forward while the upper pressure reverses the tap for backing out. The adjustable depth stop on the spindle sleeve is used for accurate depth tapping. Ball bearings are used on all revolving parts.

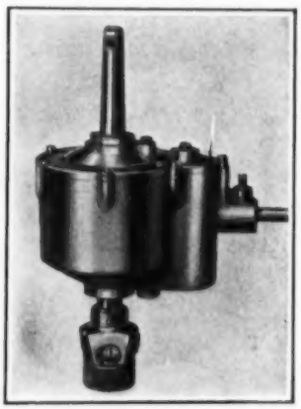
These tappers are made in three sizes with capacities of $\frac{7}{16}$ in. at 3,000 r.p.m., $\frac{5}{8}$ in. at 1,500 r.p.m., and $\frac{1}{4}$ in. at 500 r.p.m., respectively.

— 201 —

Tapping Attachment, High-Speed, No. 3, "Ettco"

Eastern Tube & Tool Co., 584 Johnson Ave., Brooklyn, N. Y. [Vol.67,p.1038]

The No. 3 size "Ettco" high-speed sensitive tapping attachment is similar in design to the No. 2, except that the range is



higher, being from 0 to $\frac{3}{8}$ inch.

The tapper incorporates a leather-lined clutch and cast-iron driving cone. If the tap sticks or hits the bottom of a hole, the clutch slips. Reverse is made at twice the forward tapping speed. Left-hand threads can be tapped as readily as right-hand ones, by locking the threaded Morse shank in the tapper.

An aluminum case and light, alloy-steel parts are used to reduce the weight so that the unit can be applied to light drill presses.

Other Machines

— 202 —

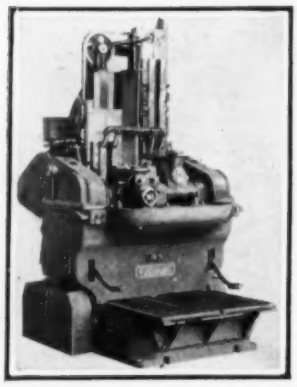
Broaching Machine, "Footburt"

Foote-Burt Co., Cleveland, Ohio. [Vol.67,p.378]

The broaching machine illustrated is intended to finish flat or irregularly-shaped surfaces. It is arranged so that one or more surfaces can be rough and finish broached in one operation.

The machine consists of a base with two uprights on which are mounted slides. On the slides are attached cases that hold the broaches. The slides counterbalance each other and as one moves up the other moves down. The drive is direct from a 17-hp. reversing motor, and dogs bolted on the left hand slide operate the reversing switch.

A tip-up fixture for holding the part to be machined is positioned in front of each slide. When the slide is at the bottom of the stroke, the fixture is in a horizontal position and the piece to be machined is placed



in it while the slide is ascending. As soon as the piece is in place, the fixture is tipped to an upright position. The slide then moves down and the piece is broached, after which the fixture is thrown back automatically for reloading.

Coolant is used on all broaching work, the entire base of the machine being used as a reservoir.

— 203 —

Die-Sinking and Engraving Machine, Universal, No. 3-X

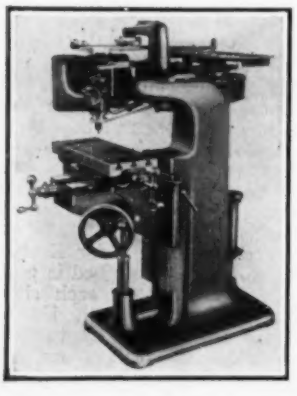
George Gorton Machine Co., Racine, Wis. [Vol.67,p.211]

This machine is suited to either heavy or light engraving and die sinking on flat or spherical surfaces. It is adapted to heavy cutting on steel dies, stamps and similar jobs in brass and cast iron that can be performed on the No. 1-S machine, but it can also do light and sensitive work such as delicate lettering.

All the pantograph joints are equipped with ball bearings. The machine has a heavy forming bar and guide for engraving on concave, convex and spherical surfaces contained within an area of 2½x4¼ inch.

The spindle is mounted on ball bearings and has speeds from 2,300 to 9,000 r.p.m. It has collet bushings for use with straight-shank cutters from ⅛ to ⅞ in size.

The table, 8x10 in. in size, has a longitudinal feed of 12 in. and a cross feed of 8¾ in.



The machine will regularly handle a disk 5 in. thick by 36 in. in diam. or smaller, and a drum 13 in. high by 26 in. in diam. or smaller.

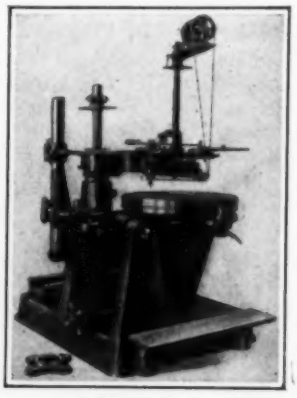
The drive is by belt from a motor mounted on the side of the machine. The machine occupies a floor space of 54x44 in., measures 54 in. high, and has a weight of 1,020 lb. net.

— 204 —

Engraving Machine for Lettering Tire Molds, No. 3-H

George Gorton Machine Co., Racine, Wis. [Vol.67,p.954]

Tire molds and other large work of a similar character can be lettered with this machine, which will accommodate a maximum thickness of mold of 14



in. The table will swing work up to 72 in. in diam. When it is in its horizontal position, work on a 54-in. circle can be engraved to within 5 in. from the center of the table.

All the joints of the pantograph are mounted on ball bearings. The cutter head is also mounted on ball bearings, as is the spindle. It has a speed of 5,000 rev. per minute.

The machine is also equipped with a forming bar and guide, so that work can be engraved on concave, convex, and spherical surfaces in general, contained within an area of 2½x4¼ in. Five index plates are furnished for production work.

The machine is furnished with a complete line of accessories and a driving motor of ½ hp. It occupies a floor space of 84x72 in., and has an overall height of 108 in. The weight is 3,500 lb. net.

— 205 —

Engraving Machine, "Sixtus"

Engraving Machine Manufacturing Co., 1960 Broadway, New York N. Y. [Vol.67,p.956]

This machine is of German design, and is being offered here for the first time. The chief

features of the unit are: The fact that the work table and the master guiding table are on the same level; a cutter of special design, together with a grinding fixture and wheel; the variety of attachments, and the means used to adjust the pantograph. The machine is for particular use in making mastertypes, but can also be employed for other engraving operations as well.

The machine consists of a circular base and pedestal supporting the knee for the adjustable work table, the fixed guide table, the spindle drive mechanism, and the pantograph. Drive is by motor and four independent belts. The normal spindle speed is 12,000 r.p.m. The spindle may be supplied with plain tapered bearings or with ball bearings.

Ratios of reduction from 1 to 1 down to 1 to 15 are available on the pantograph. The overhanging weight of the tracer end of the mechanism is carried on a roller which is free to move along a pivoted bar, thus relieving the operator of the weight of the pantograph. Adjustment of the pantograph arms is positive through the medium of racks and pinions.

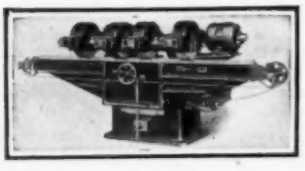
The attachments include a circular table 10 in. in diam., a small machinist's vise, and a chuck mounted on a universal fixture.

— 206 —

Buffing Machine, Strip, Automatic

Mitchell Engineering Co., Springfield, Ohio. [Vol.67,p.332]

The automatic strip buffing machine is adapted for buffing automatically strips up to 3 in. wide. The strips are laid on the conveyor belt at the left end of the machine, and the belt carries them past the wheels



and discharges them at the right. The rate of feed is dependent upon the nature of the work being buffed, and may be changed to suit.

The machine is provided with four buffing wheels. Each pair of wheels is a separate unit and is driven by a 10-hp. motor. Each pair of wheels rotate in opposite directions, the method of buffing being for one pair of wheels to engage the strip from the center to one outer edge, and the other pair of wheels from the center to the other outer edge. The conveyor table may be raised or lowered to keep the wheels in proper contact with the work.

Weight, 6,000 lb. approximately.

— 207 —

Buffers and Disk Grinders, Combination

Standard Electrical Tool Co., 1938 W. Eighth St., Cincinnati, Ohio. [Vol.67,p.639]

Combination buffers and disk grinders are being made in four sizes in capacities of ½, 1, 2, and 3 hp., respectively. The illustration shows the 2-hp. unit driven by an a.c. motor at 1,750

r.p.m. The diameter of the steel disk is 12 in., and it is reversible so that various types of disks can be used on both sides of the wheel The table used on this machine measures 7x14 in., and has both vertical and horizontal adjustments.

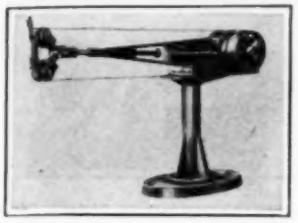
The armature shaft is made of high-grade nickel steel, and is carried in three SKF ball bearings, inclosed in dust-proof chambers. The motor is controlled by a suitable push button.

— 208 —

Polishing Machine, Flexible Belt, Motor-Driven

Defiance Machine Works, Defiance, Ohio. [Vol.67,p.832]

Curved surfaces and irregularly-shaped metal parts can be finished with the No. 726 motor-driven flexible belt polishing machine. It is regularly furnished with one 2-in. polishing



belt, but it is possible to adapt the machine for use with a wider belt.

The frame is a substantial casting with a cored center and a broad base. The adjustable arm, which supports the two idler pulleys over which the polishing belt travels, can be set in any desired position. The arm is mounted on coiled springs to provide flexibility to the belt.

All the running parts are accurately balanced to eliminate vibration and to permit the belt to be run at a speed of 5,000 linear feet per minute. The machine is regularly furnished with a 2-hp. motor with starter.

Floor space 76x26 in.; shipping weight 604 lb.

— 209 —

Grinder, Abrasive Band and Disk, Duplex-M

Walls Sales Corporation, 96 Warren St., New York, N. Y. [Vol.67,p.403]

The improved abrasive band and disk grinder known as the Duplex-M, is motor driven and has the regular quick-change band feature. The table over

which the band operates is 10¼ in. long by 5 in. wide. A 4-in. wide abrasive belt is used and can be adjusted to any fixed position.

The grinder has a 12-in. removable steel disk and a grinding table which may be raised or lowered or turned to various angles. Rough grinding can be done on the disk and finishing on the abrasive band.

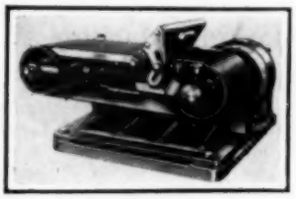
The grinder is operated by a ½-hp. motor connected by means of a silent chain. It occupies a floor space 29x24 in. and weighs 225 pounds.

— 210 —

Grinder, Abrasive-Band, Simplex B-M

Walls Sales Corporation, 96 Warren St., New York, N. Y. [Vol.67,p.516]

The Simplex B-M, motor-driven, abrasive-band grinder is for use in straight-grain grinding with a rough, smooth or fine finish according to the grit of the band. The variety of finishes possible and the high



productive output make it desirable for finishing metal, composition, and wood parts. The abrasive band can be quickly changed.

The table over which the abrasive band operates measures 18x10 in. Special fixtures may be fastened to the table. A belt 8 in. wide by 61 in. long is used. A removable bevel attachment is also supplied.

A 1-hp. motor furnishes the power to operates the grinder.

Bench space 28x31 in.; weight 426 lb.

— 211 —

Spotter

Anderson Bros. Manufacturing Co., Rockford, Ill. [Vol.67, p.389]

The spotting tool illustrated is for performing the operation known as frosting or flaking. It consists of a set of two spotting tools with various sizes of guides for handling different widths of work. The long-handled spotter is for heavy spotting and the short one for lighter work.

As the tool is pushed across the guide, which is placed upon

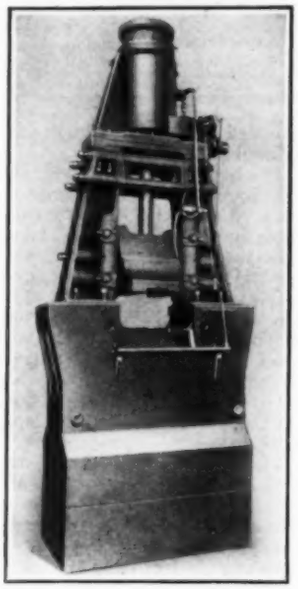
the work being spotted, a rocking action is given to the blade, causing it to give the half-moon effect on the work. A variation of different shaped spots may be obtained. The work can be done much faster than by hand, even with inexperienced operators.

— 212 —

Drop Hammer, Steam, Large-Size

Chambersburg Engineering Co., Chambersburg, Pa. [Vol. 67,p.168]

What is said to be the world's largest and most powerful steam drop hammer, was built by this company for use in drop forging valve bodies for high-pressure steam service. The total finished weight of the hammer is approximately 536,000 lb., while the overall height is 32 ft. 6 in. The weight of the



ram without the top die is 22,000 pounds.

The heaviest part of the hammer is the anvil which weighs 440,000 lb., and is made in three pieces.

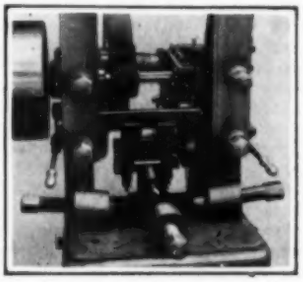
The frames are of I-beam construction, tied into the anvil with positive stops and compound wearing edges. The tops of the frames are tied together with an interlocking tieplate and double tie bars. The cylinder is locked into the tieplate on its base and is fitted with balanced piston-type operating valve. It is also equipped with a patented safety cylinder cover.

— 213 —

Drop Hammers, Automatic, With Roll Feed

Standard Machinery Co., Auburn, R. I. [Vol.67,p.393]

Automatic roll feed of the conventional type has been added to the automatic drop hammers made by this company. The roll feed is inverted from its usual position, however, in order to clear the poppet screws used for holding the dies in the machine. As on a power press,



the length of stroke is controlled by an adjustable eccentric disk mounted on the driving mechanism of the machine. The feed is designed particularly for use in embossing designs in sheet stock.

This type of feed is said to increase production about 45 per cent and to show a similar saving in the subsequent trimming operations. The feed also acts as a safety device, as the front of the hammer is inclosed by a guard.

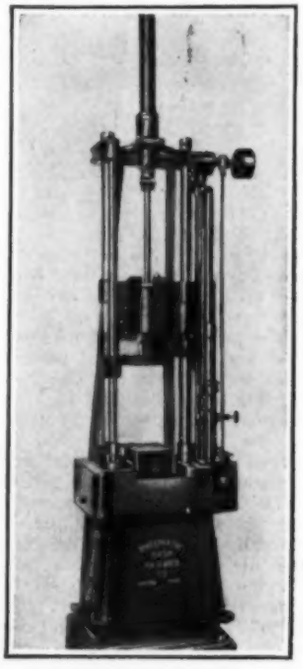
— 214 —

Drop Hammer Pneumatic, Improved

Pneumatic Drop Hammer Co., 261 Franklin St., Boston, Mass. [Vol.67,p.521]

The head of this hammer is lifted by air pressure in a cylinder mounted vertically on a tie-bar at the top of the column. The blow is delivered by the falling weight of the head, unassisted by air pressure, but the force of the blow may be set to any desired amount within the capacity of the machine by adjusting the control valves to give a cushioning effect.

The head slides upon two steel columns, and is released to



strike the blow by a safety device which will not permit release to occur while the operator's hands are in the danger zone. Release may also be by a treadle. The hammer is rapid in action, because the head is picked up instantly on the rebound by the air cylinder.

The hammer is made in all sizes from 50 lb. up. The anvils are ordinarily made to weigh fifteen times as much as the heads, but may be made in 20-to-1 ratio for special work, if desired.

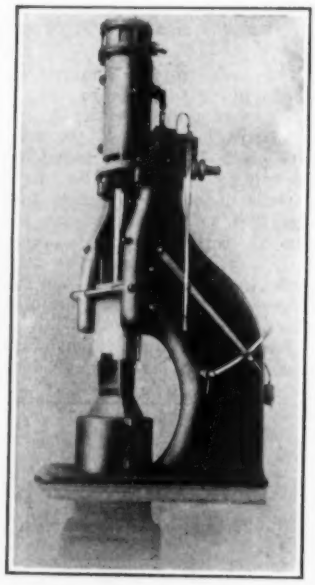
— 215 —

Steam Hammers, High-Frame

Chambersburg Engineering Co., Chambersburg, Pa. [Vol. 67,p.876]

The high-frame steam hammer is recommended for forging large disks and rings, for upsetting high-steam, forming arch bars, and for long punching with drifts.

The cylinder features self-drainage and deep stuffing boxes. It is fitted with a patented safety cover and safety valve.



The throttle valve is of the rotary self-feeding type, and the operating valve is a balanced-piston type. It is actuated by a cam on the ram incline without any fixed connections.

The guides are made of semi-steel and are supported on five sides by the frame. The ram is made of an open-hearth, steel forging, and is set at an angle to the frame. The rod is forged of similar material and is formed solid with the piston.

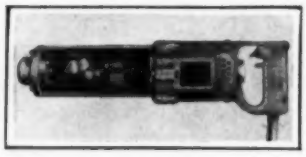
These high frame hammers are made in nine sizes, designated by the weight of the ram, the die, and the piston rod, varying from 700 to 6,000 lb. The cylinder bores range from 7 to 21 in. in diam. and the stroke from 23 to 48 in. Corresponding minimum die spaces are fixed at 6x11½ and 12x21 inches.

—216 —

Electric Hammer

Black & Decker Manufacturing Co., Towson, Md. [Vol.67, p.35]

The motor in this hammer is a universal type operating on direct or alternating current, from 25 to 60 cycles. The armature rotates at approximately 10,500 r.p.m. and is



equipped with an aluminum centrifugal fan.

The armature shaft is hollow to accommodate the spline shaft upon which the reciprocating hammer mechanism is mounted. This mechanism comprises two bevel gears heavily weighted on half of their area and driven by a bevel pinion. When the two weights are together at the bottom, the whole reciprocating mechanism moves downward and strikes a blow on the piston. On the upward stroke, the blow is absorbed by a coil spring.

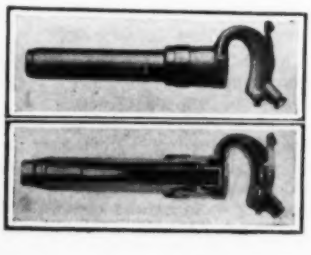
The piston is also supported by a heavy coil spring to absorb the hammer blow when it is running idle. When the hammer is working, this spring is rendered ineffective. The hammer strikes about 2,300 blows per minute.

— 217 —

Hammer, Riveting, "Cleco"

Cleveland Pneumatic Tool Co., Cleveland, Ohio. [Vol.67, p.290]

The "Cleco" riveting hammer is said to be entirely free from vibration. The chief feature of the tool is the main valve, which is tubular in form: It is short, light in weight, and has solid walls free from port holes. Pistons of different lengths may be used without detriment to the tubular valve. A cushion chamber is provided in the rear end of the valve block, integral with the block and in alignment with the valve and cylinder.



An air reservoir provided between the outer walls of the valve block and the inner bore of the handle, forms what is called a "power pocket" in which air is stored up and discharged on the piston at the beginning of each stroke.

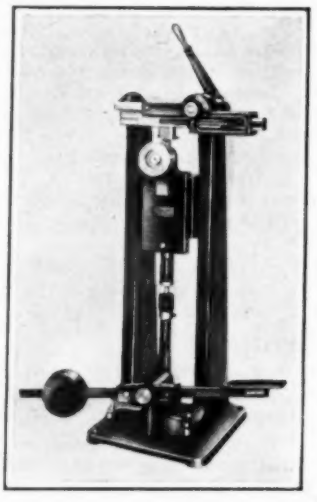
The balanced throttle valve is operated by a lever which operates within a steel sleeve seated in a recess provided in the handle. The valve action provides a fine regulation of the air supply.

— 218 —

Marking Machine, Special

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.67,p.169]

The Standard No. 3 hand-operated marking machine has been redesigned for use in marking on the outside edges of cups, rings, cooking utensils and the like of large size. To this



end a special slide and special roll fixture have been substituted for the table. Almost any size of article up to 2 ft. in diam. can be marked.

A flat marking die or steel type set in a holder is used. The die is passed over the work through a forward motion secured by a rack and pinion operated by a hand lever. The work holder is a part of the machine.

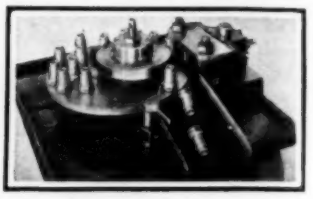
— 219 —

Marking Machine, No. 25

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.67,p.378]

The No. 25 rapid-production marking machine is for marking such parts as spark plugs, screw machine products, round bushings, and similar articles with a sufficient body to be marked without being crushed.

The working parts of the machine consist of a central dial acting as a pressure dial, which carries the work across the lettering die, and a loading table which carries the work forward to the marking position. After being marked, the parts are unloaded automatically and carried down a chute.



The machine is claimed to have a production capacity for marking 125 pieces per min. A ¼-hp. motor is regularly furnished.

The weight of the machine is 425 pounds.

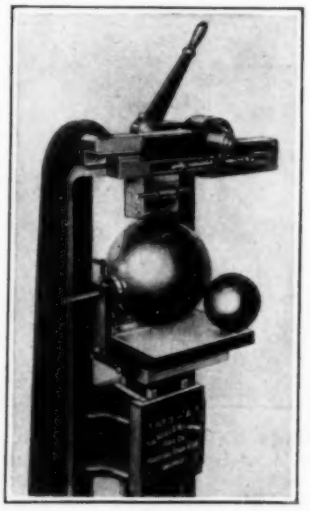
— 220 —

Marking Machine, Special

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.67,p.1041]

The special marking machine was designed for marking bowling balls of different sizes with a trade name and a serial number. This marking is put on with the use of a special marking die in combination with an automatic numbering head. The wheels of the numbering head in the die are set to a bevel so as to mark on the circumference of a hard rubber ball.

The special numbering head is equipped to work automati-



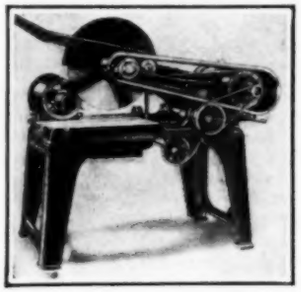
cally and one figure is advanced at each depression of the lever. The table or holding fixture is provided with a roller bearing slide and two adjustable stops to permit the balls to be placed in a central position under the numbering head. Pressure is applied through a treadle. The mark is made by rotating the ball on the roller bearing fixture.

— 221 —

Metal Cutoff Saw, No. 1-B, with Pipe-Cutting Attachment

Hunter Saw & Machine Co., Pittsburgh, Pa. [Vol.67,p.176]

A rotating device for cutting pipe up to 8 in. in diam. has been applied to the No. 1-B high-speed metal cutoff saw made by this company. The



device is driven from the pulley on the motor that drives the saw. Rotation of the device is controlled by a clutch on the left side of the machine that is thrown into action when the saw frame is pulled down into cutting position.

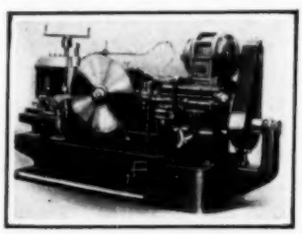
The machine is equipped with a 10-hp. motor, a starter, endless belt, two saw blades, and the necessary wrenches.

— 222 —

Metal Sawing Machine, Improved No. 66

Cochrane-Bly Co., Rochester, N. Y. [Vol.67,p.381]

An improved metal sawing machine, giving three cutting speeds of 45, 60 and 75 ft. per min., has been brought out. The



speed changes are made by means of sliding gears made of hardened nickel steel. The machine has a backgear shaft mounting the worm fully inclosed in the carriage with the worm gear and the spur drive gear.

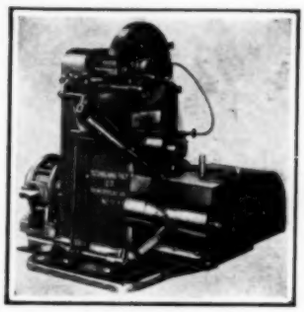
The drive shaft runs in ring oiling bearings, and the friction clutch hub is provided with a self-oiling bushing. The machine has a range of feeds from ¾ in. up to about 9 in. per minute.

— 223 —

Cutoff Saw, Semi-Automatic, No. 21

Cochrane-Bly Co., Rochester, N. Y. [Vol.67,p.406]

The No. 1 semi-automatic high-speed cutoff saw is intended for sawing non-ferrous metals, light gages of steel, tubing and shapes. It is provided with a quick-change gear box, giving six changes of speed up to 50 ft. per min. It is also arranged for change gears to give a variety of feeds. The gear box contains a friction safety



drive, by means of which it is possible to regulate the pressure of the saw against the work.

The machine is operated through a positive pin clutch, controlled by a treadle. The vise is automatic, opening and closing with the movement of the saw carriage, and releasing the cut piece on the return stroke of the carriage. This construction permits the feeding of the bar through the gage before the next forward movement.

— 224 —

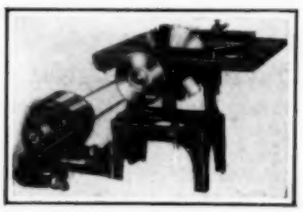
Saw Outfit Combination, No. 8

Scott - Bansbach Machinery Co., 132 S. Clinton St., Chicago, Ill. [Vol.67,p.673]

The small universal sawing outfit can be used for both wood and metal work, and it is supplied with a number of extra attachments to increase its utility.

The unit is regularly supplied with an 8-in. combination saw for both ripping and cross-cut work. A 12-in. ripping fence is provided, as well as an adjustable cutoff miter gage. The saw table measures 12x16 in. and is equipped with a 2-in. insert, which can be removed.

The table can be tilted back



and a guard placed over the saw so that the spindle can be used for drilling, grinding, or polishing. For this purpose a 6-in. buffing wheel, a three-jaw chuck, a 6-in. sander, and a 5-in. emery wheel are supplied.

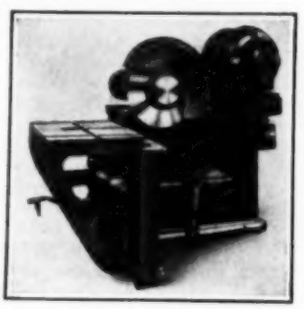
The machine is driven by belt from a ½-hp. a.c. motor adjustably mounted on the base so that the belt tension can be regulated.

— 225 —

Sawing Machine, Semi-Automatic, General-Purpose

Espen-Lucas Machine Works, Philadelphia, Pa. [Vol.67,p.756]

This semi-automatic, general-purpose sawing machine was designed especially for sawing buss bars up to 8x¾ in. of either copper, bronze or brass, and tubes and extruded shapes up to 4 in. in diam. Small bars



and tubes may be held and cut off in multiple. The maximum feed is 2 in. per second.

The work table is vertically adjustable for holding different sizes and shapes and the platen is arranged for the attachment of air- or mechanically-operated fixtures and the like. Operation is by a treadle at the front of the machine. When the treadle is depressed, the saw blade is fed automatically forward and is automatically quick returned to the starting position upon completion of the stroke. The movement of the saw carriage is obtained by an Espen-Lucas low-pressure oil pump.

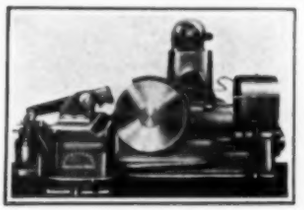
— 226 —

Sawing Machine, Production, High-Speed, Semi-Automatic

Espen-Lucas Machine Works, Philadelphia, Pa. [Vol.67,p.1041]

Fast sawing, quick handling of material and of the machine between saw cuts are featured in this semi-automatic production sawing machine.

It was designed expressly for cropping ends and sawing to



length cast, solid and tube billets and for supplying billets to an extruding mill at the rate of two billets per min. The machine will saw through a solid billet 7 in. in diam. in 7 sec., plus 3 sec. for clamping and unclamping. The output is largely dependent upon the facilities for passing the work through the machine.

Quick return as well as quick feed traverse to the saw carriage is accomplished by an Espen-Lucas low pressure oil feed system. Quick-acting clamps can be controlled either by air or oil pressure. The controls are all located at the table end.

The drive may be either by a d.c. or an a.c. motor, either of the constant- or variable-speed type, depending upon the characteristics of the metals to be cut.

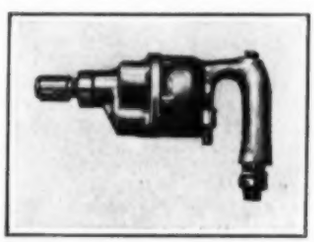
— 227 —

Screw Driver Automatic, Air-Operated

Buckeye Portable Tool Co., Dayton, Ohio. [Vol.67,p.487]

What is claimed to be a novelty in small tool construction is the automatic screw driver shown. The tool is air operated and is built on the rotor principle. It is capable of driving a No. 15 screw 3½ in. long into yellow pine filled with pitch without previous tap hole drilling.

The tool has a number of improved features, one of which



is its ball bearing construction throughout. Another feature is the entire absence of valves and a button throttle control. The gears are of heat-treated, chrome-nickel steel.

The largest diameter of the tool is 3⅛ in., the length of the main body is 6 in., and the length overall 10 in. The weight is 5¾ lb. It is furnished complete with a quick-change chuck.

Besides screwdriving, the tool is also useful for setting of nuts, caps and set screws.

— 228 —

Screwdriver, Magazine Feed, "Universal"

Detroit Power Screwdriver Co., 419 Riopelle St., Detroit, Mich. [Vol.67,p.795]

Machine screws ranging in size from No. 4 to ¼ in. and from ¼ to 1¼ in. in length can be driven in the Model B-2 "Universal" screwdriver with magazine feed. With other models, wood screws and self-tapping screws can be driven in a similar manner. The pick-up

mechanism dips into the hopper at each revolution and lifts a handful of screws into position for delivery.

For the driving of machine screws, the recommended spindle speed ranges from 1,200 to 1,750 r.p.m. The outstanding feature of the unit is the friction mechanism. As it seeks the slot of the screw the bit slowly rotates by a slight dragging action. Once the slot is located the screw can be driven home. The tension at which screws may be set is under control.

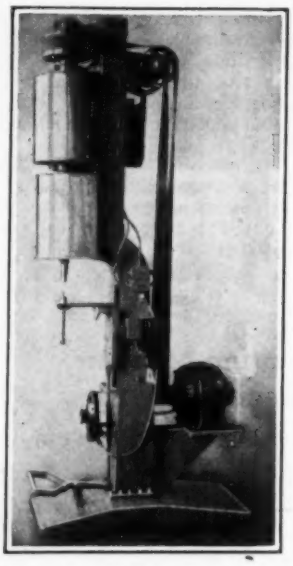
The holding fingers assembled with the spindle carry the screw down through the full stroke and release their hold after a thread or two have been engaged. As a result screws can be driven in the bottom of a tube or cup as small as 1 in. in diameter.

— 229 —

Nut Driving Machine, Reynolds

Metalwood Manufacturing Co., 3362 Wight St., Detroit, Mich. [Vol.67,p.872]

Such work as the assembling of bearing caps, or any work that requires nuts or caps to be



driven and tightened in pairs, can be performed on the Reynolds two-spindle nut driving machine.

The machine is equipped with a substantial column, on the rear of which is a bracket carrying a 2-hp. constant-speed motor. Countershaft drive is optional equipment. The lower end of the main drive shaft supports a magnetic clutch, and a mechanical switch operated through an epicyclic gear train controls the clutch circuit. The two spindles are driven through a differential of special design. One spindle is mounted in a slide which is adjustable across the column from 2$\frac{7}{16}$ to 6 inches.

The lower end of the spindle carries detachable socket wrenches in which nut or capscrews are placed and held magnetically. A table or fixture carries the parts being assembled.

If one of the nuts or screws should begin to tighten before the other, the differential slows down or stops this one and speeds up the lagging one until both nuts are of equal tightness.

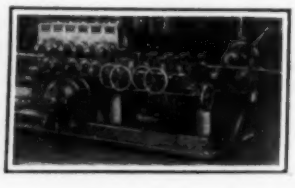
Every rotating part, except the slow moving epicyclic gear, is carried on ball bearings.

— 230 —

Roll Straightener, Combination, No. 2A

Kane & Roach, Inc., Syracuse, N. Y. [Vol.67,p.171]

The No. 2A machine is for straightening rod materials in two planes in one pass. Through the use of proper rolls, it will handle any of the various shapes



and sizes that can be straightened on this company's standard straightening rolls. The machine has a capacity of ⅜ to 1¼-in. hexagon stock, or proportionate shapes.

The pyramid unit shown to the right of the machine is optional, and is used to remove the major bow of the material. After leaving this unit, the material passes through the vertical roll shaft unit, and from there it is guided into the horizontal rolls.

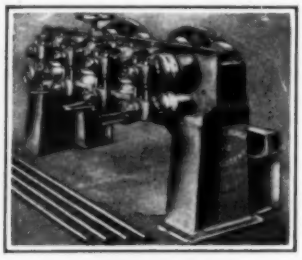
The machine is of rugged construction, and is mounted on a single bedplate. One 15-hp. motor drives all three units, and the delivery speed is 125 ft. per minute. The machine is built in several sizes, and can be modified to meet specifications.

— 231 —

Tube Sizing and Straightening Roll

Kane & Roach, Inc., Syracuse, N. Y. [Vol.67,p.953]

The roll is for reducing in size and straightening tubing. The equipment is of rugged construction throughout, and all roll shafts are rigidly tied together with outer bearings. All



horizontal roll shafts are gear driven, while the vertical roll shafts are idle.

The upper horizontal roll shafts are mounted in eccentric bearings to provide for adjustment. The last pair of vertical rolls are also adjustable up and down as well as in and out, so that the straightening function of the machine can be performed.

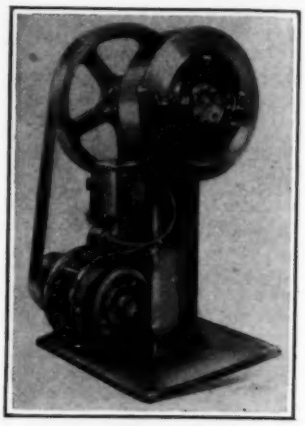
The rolls are made of special analysis tool steel, heat-treated and ground to size. The unit is arranged for direct connection to an electric motor and will deliver tubing at a speed of 75 ft. per minute. It is available in several sizes and is built to meet specifications.

— 232 —

Swaging Machine, 4-Die, Improved, Dayton-Torrington

Torrington Co., Torrington, Conn. [Vol.67,p.921]

Slightly increased capacity is now available on the No. 3 size of the Dayton 4-die swaging



machine. The present capacity on solid stock is ½ in., and on tubular stock is ¾ in. The complete line of 4-die swaging machine in sizes Nos. 3, 3½, and 4, was described on page 79, Vol. 62, of the *American Machinist*.

In the illustration, the machine is shown equipped with a motor mounted on the side of the pedestal driving by belt with an idler tightener. The machine may also be supplied without a motor, in which case the drive is from an overhead countershaft.

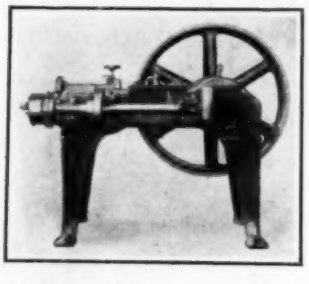
— 233 —

Swaging and Forming Machine, Wire, Automatic

E. J. Manville Machine Co., Waterbury, Conn. [Vol.67,p.919]

The automatic machine to cut off, swage, and bend, or form wire into various shapes is made in two sizes with capacities for wire of $\frac{5}{32}$ and ¼ in. in diameter.

The mechanism comprises a roll-feed, actuated by a ratchet with adjustable stroke to feed the wire from a reel at the side



of the machine; a cut-off; a transfer slide to carry the cut length of wire to the tools; a ram in which the swaging tools are secured; and means to bend or form the cut wire into any desired shape.

Though designed primarily for the manufacture of tongues for buckles, the shape of the product is determined almost wholly by the tools with which the slides are provided, and the machine is, therefore, adaptable to a large variety of parts that can be made of soft wire.

The No. 1 machine occupies a

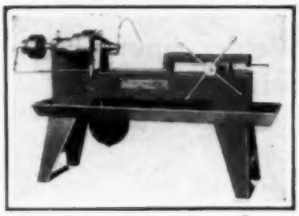
floor space of 36x66 in., and weighs 400 lb. The No. 2 machine covers a space of 40x73 in., and its weight is 700 pounds.

— 234 —

Chucking Machine, No. 2½, Air-Operated

John B. Stevens, Inc., 27 Cleveland Place, New York, N. Y. [Vol.67,p.254]

The machine is equipped with a plain slide but a regular six-hole hexagon turret with slide and base can be furnished in its place. A pan, pump and piping are regularly furnished.



The machine has a double friction countershaft and is driven by a 3½-in. belt.

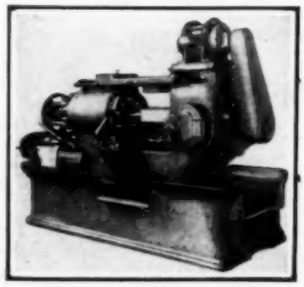
It is designed to operate wrenchless chucks, collets and expanding mandrels of the drawback type, which can be readily fitted to the front end of the machine spindle. Air pressure ranging from 65 to 100 lb. per sq.in. is used. A turn of the valve causes the spindle to stop instantly and the chuck jaws to open. After the next piece of work has been inserted, a turn of the valve causes the chuck jaws to grip instantly and the spindle to revolve. The spindle is hardened and ground and runs in large bronze bearings. A multiple disk clutch controls its rotation.

— 235 —

Automatic, 4-Spindle, 1⅜-Inch Gridley

National Acme Co., Cleveland, Ohio. [Vol.67,p.395]

The 1⅜ in. 4-spindle Gridley automatic is designed around the familiar basic Gridley idea of carrying the longitudinal turret upon a continuation of the spindle carrier. Beyond this general principle of design, however, many radical changes have been made over previous models.



The spindles are all equipped with special SKF ball bearings. The length of the spindle carrier between its bearings has been increased and a third disk has been added to take care of the Geneva stop revolving mechanism, which has also been redesigned to cut the idle time and to reduce the shock. Changes have also been made in the stock feeding mechanism to bring about more positive action.

The cross-slides, both front and rear, have been increased in area and there is more power available to them. The power is delivered to the cross-slide by direct cam action. The forming slides have also been increased in size.

The so-called feed-bracket mechanism, which controls the spindle speed, rate of feed, indexing, operation of auxiliary mechanism, etc., has been entirely redesigned. The shafts in this mechanism, as well as all other high-speed shafts in the entire machine, are mounted upon ball bearings.

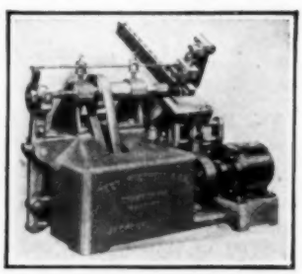
The pan on the machine is different in appearance and in internal arrangement. Four large ports with external lips permit the clearing out of the accumulated chips, and the pan, is arranged so that the bulk of the oil is immediately separated from the hot chips.

— 236 —

Chamfering Machine, Automatic

Teer, Wickwire & Co., Jackson, Mich. [Vol.67,p.555]

A production of 60 to 100 pieces per min. is claimed in this automatic machine for chamfering holes in screw machine products. The unit has a



capacity for parts ranging from ⅜ to 1⅜ in. in diam. and from 1 in. to 2 in. in length. Hexagonal or octagonal parts may be chamfered by the use of a special attachment. The machine is built for one particular size, but other sizes can be handled by changing the magazine and ejector plates.

The parts are loaded in the magazine in the form of a column held against the ejector plate with the lowest part approximately concentric with the chamfering tool. The ejector plate removes the bottom part from the column of parts in the magazine after it has been chamfered.

The number of strokes per minute may be easily changed by substituting different change gears. The machine is arranged for drive by a ½-hp. motor and is designed to be mounted on a low bench.

Bench space, 15x30 in.; weight, 450 lb. approximately.

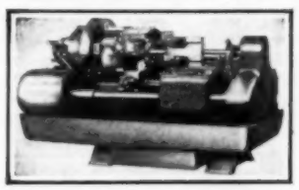
— 237 —

Screw Machine, Automatic, Four-spindle

Greenlee Bros. & Co., Rockford, Ill. [Vol.67,p.671]

In this four spindle, 1¼x6-in. automatic screw machine, are incorporated some unusual mechanical movements not hitherto used in screw machine design.

The tool slide, a section of which is an inverted T, is operated by a rack in combination with a plate cam for positioning



the slide at the end of its stroke. The quick return, approach and feeding cycle of the slide is controlled by adjustable dogs.

Each spindle is mounted on four Timken roller bearings. The indexing of the spindle carrier is effected by a combined Whitworth crank motion and a Geneva movement driven from the main gear box. Indexing and stock feeding takes place between the fourth and first positions, leaving the fourth position open for end operations as well as cutting-off.

Four cross slides are provided, one for each spindle. Movement is through a rack and segment arm controlled by small pick-off cams. Independent feeds are available for all four slides, the maximum travel of each being 1¼ in. Spindle speeds range from 250 to 1,200 r.p.m., while the feeds range from 0.002 to 0.015 in. per revolution.

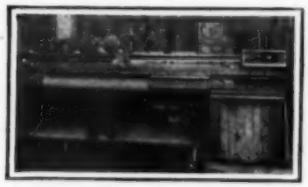
Either self-contained motor drive or single pulley belted drive may be obtained.

— 238 —

Welder, Carbon-Arc, Automatic, for Range Boilers

Lincoln Electric Co., Cleveland, Ohio. [Vol.67,p.213]

On 14-gage steel, the welder makes a speed of 150 ft. per hr. and costs slightly over one cent per foot of longitudinal



seam. The side seam is welded with a filler road which is laid on the seam and fused into the joint by the carbon arc.

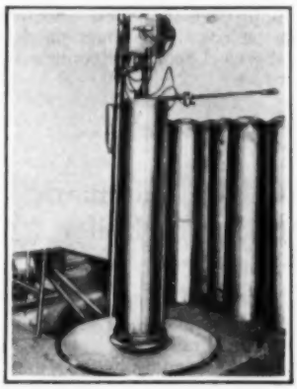
The range boiler is slipped on to the mandrel and clamped into position. Water-cooled copper guards confine the arc to the seam. The clamps also carry the upper rail on which is mounted the carriage for the automatic welding head. This motor driven head is carried along the seam automatically.

— 239 —

Bottom Welder for Tanks, Automatic

Lincoln Electric Co., Cleveland, Ohio. [Vol.67,p.365]

Seams on cylindrical tanks, such as range boilers, can be welded with this carbon-arc automatic welding machine. The equipment is standard for tanks up to 6 ft. in diam. and 8 ft. high, while special equipment can be furnished to handle any



diameter or length of tank. A welding rate of 135 ft. per hr. is claimed for the lap head seam on range boilers of 14-gage material.

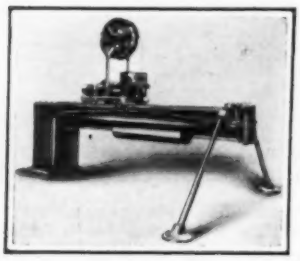
The tanks to be welded are set on the revolving table and the arm carrying the automatic welding head is adjusted to bring the arc on the seam. The speed of the revolving table is adjustable, as well as the welding current.

— 240 —

Seam Welder, Arc, Automatic

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.67,p.563]

This automatic longitudinal seam welder is especially recommended for the manufacture of



pipe and tanks made from steel sheet and plate varying in thickness from $\frac{1}{16}$ to $\frac{3}{4}$ in. The standard machine will handle pipe and tank barrels varying in diameter from 10 to 40 in. and up to a maximum length of 8 ft. Greater diameters may be accommodated by providing a pit in the floor.

The machine consists of two parts, a clamping mechanism for holding the material to be welded and an automatic traveling welder for making the weld. The welder consists of a carriage containing a driving motor, an automatic-arc welder and a reel for welding wire. The carriage is driven in either direction at speeds from 5 to 50 in. per min. The welding current may be varied from 175 to 300 amperes.

The clamping mechanism is attached to a horizontal bridge, consisting of two parallel beams on which the welder carriage travels. A standard railroad rail projects from the base and the tank is slipped over the free end and clamped by compressed air.

— 241 —

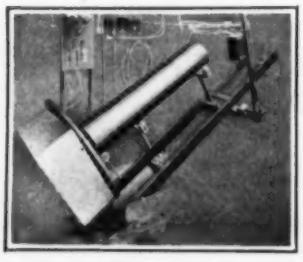
Welder, Automatic, for Range Boiler Heads

Lincoln Electric Co., Cleveland, Ohio. [Vol.67,p.757]

The "Stable-Arc" automatic welding machine was designed for the purpose of welding the heads in range boilers. The tank is mounted in an inclined position on a rotating table, which is driven by a small variable-speed motor to provide speed adjustment for tanks of various diameters. Roller rests maintain the alignment of the work. The carbon electrode is carried by an adjustable arm supported from a rigid pedestal.

No filler metal is required in this operation since the head is flanged and is inserted so that a lap joint is secured as in a riveted tank. The heat of the arc melts the edge of the lap, thus fusing it with the head and forming a solid, leak-proof joint. On 14-gage material, seams have been welded at the rate of 135 ft. per hour.

While these machines were developed primarily for welding range boilers, they are equally applicable for welding all kinds of small cylindrical tanks.



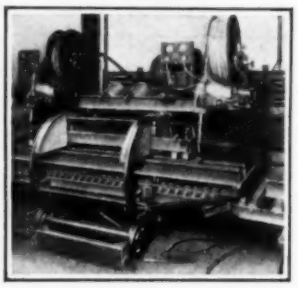
— 242 —

Welder, Metal Railroad Tie

General Electric Co., Schenectady, N. Y. [Vol.67,p.875]

The welding apparatus developed for making metal railroad ties from scrap rails consists of an automatic tie-welding machine and a 1,500-amp. motor-generator set with two circuits for hand welding and two circuits for automatic welding.

There is also the following equipment: A section of a roller conveyor on which the rails are moved into position; a jig for correctly spacing the rails and locating the tie plates on top of them; two pneumatic plungers



for holding these parts rigid; a pair of spring and toggle-operated clamps for holding angle irons against the ends of the rails; a mechanism that rotates the whole jig with its rails and plates; two automatic welders mounted on individual travel carriages for welding the tie plates simultaneously, and a track on which the carriages ride. The jig can be turned in either direction so that welding can be done first on one side of the tie plate and then on the other.

While these automatic welds are being made, the operator welds the angles to the ends of the rails by hand.

— 243 —

Welder, Automatic, for Automobile Bodies

Taylor-Winfield Corporation, Warren, Ohio. [Vol.67,p.331]

The machine is designed for welding the backs of automobile bodies to the two side panels.

The capacity is an 18 gage sheet, 36x72 inches.

The back is clamped in the center of the machine, and each side panel is clamped at the right and left side, respectively, by means of toggles operated by air. Each set of outside heads is worked independently so that one side is first welded, after which the opposite side is then started. After unclamping, the entire back of the car is lifted out as a unit.

Both the upper and the lower dies are removable so that various shapes can be accommodated, and replacements made The angle adjustment possible is from 15 to 35 deg. from the horizontal. The welding centers are adjustable from 34 to 50 in., according to the degree that the machine is set.

The machine is equipped with two 200-kw. water-cooled transformers and the power is provided by two 3-hp. motors. The upsetting from the machine is automatic. The machine measures 13½ ft. by 6 ft. 9 in. and has a height of 72 in. The weight is 20 tons net.

— 244 —

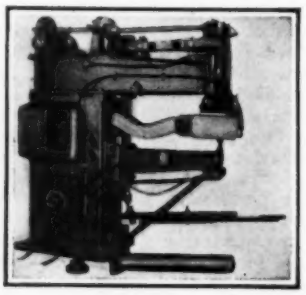
Welder, Seam, Double-Roller, No. 375

Thomson Electric Welding Co., Lynn, Mass. [Vol.67,p.291]

The No. 375 double-roller seam welder has a capacity for welding two pieces of No. 22 gage to ¼-in. iron or steel, depending on length of seam and the type of weld desired.

The horns are made of cast copper, water cooled. Two lower horns are provided, one for welding longitudinal seams and the other for welding circular seams. The maximum diameter of cylinder that can be welded longitudinally is 8 in. Special horns for both longitudinal and circular seams can also be furnished.

The rollers are made of hard



rolled copper and the shafts are cooled. The upper roller is mounted on the head and can be turned at right angles for use with either longitudinal or circular seams. Pressure is obtained through a treadle.

The transformer of the welder is rated at 100 kva. The secondary is water-cooled and the primary coils have fifteen taps connected to a regulator mounted on the frame of the welder. The drive may be either by belt or by a ½-hp. motor through a gear reduction unit. Change gears give welding speeds of 6, 9, 12, and 15 ft. per minute.

Floor space, 25x36 in.; weight, 4,700 lb. net.

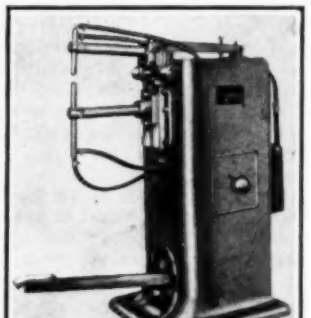
— 245 —

Welder, Spot, Series No. 180

Thomson Electric Welding Co., Lynn, Mass. [Vol.67,p.333]

The spot welder is rated at 7½ kw., or 10 kva., for continuous production. It has an extra "high" tap that can be used for intermittent welding, in which case the load may be increased to 17 kva. The transformer is of the air-cooled type.

The capacity of the machine is for two pieces of No. 16 gage



sheet iron on average production. Two pieces of stock ⅛ in. in thickness can be welded at a slow rate of speed. Aluminum and brass up to No. 22 gage can be welded with special dies.

The horns are made in two throat depths of 12 and 18 in. and a drop plate allows vertical adjustment of 4 in.

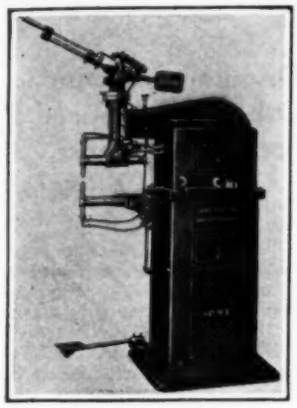
Floor space, 24x20 in.; height, 48 in.; weight, 700 pounds.

— 246 —

Spot Welders, Type C

Acme Electric Welder Co., Los Angeles, Cal. [Vol.67,p.370]

For heavy work on flat sheets and formed parts where considerable pressure is required



on the pieces to be welded but where no great depth of throat is needed, the type C spot welders have been developed. The units are particularly useful in the manufacture of wrought-iron fixtures, ornamental iron work, switch boxes and the like. The machine can be operated by a treadle for production work, or by hand for heavy-duty work.

The lower horn is mounted on a vertical column which permits the horn to be swung to either side of the machine or raised and lowered, so that all sorts of odd-shaped pieces can be handled. The electrodes are water cooled and are 1 in. in diam. to insure long life.

The current is controlled through a magnetic switch operated automatically by a treadle or through a thumb button in the hand lever. For hand operation the toggle type head is used. An 8-step rheostat is used to regulate the voltage at the welding point.

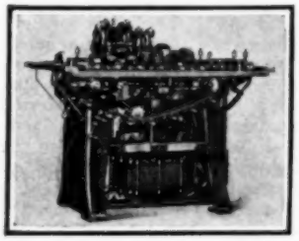
The type C welders can be furnished in two depths of throat, 18 and 32 in. The transformer capacities are 15 and 25 kw., respectively, and the weights 1,300 and 2,000 pounds.

— 247 —

Welder, Ring, No. 28

Thomson Electric Welding Co., Lynn, Mass. [Vol.67,p. 520]

This fully-automatic machine was especially designed for welding harness rings. A production speed of 20 to 30 rings per min., depending upon the size of wire, is claimed. The machine makes the weld, passes the welded ring along to a striking die that flattens out the flash, and then to a trimming die that shears off the flash.



The operator inserts the rings in jigs mounted on an endless chain.

From wire $\frac{1}{4}$ to $\frac{5}{16}$ in. in diam., rings from $1\frac{1}{4}$ to $2\frac{1}{2}$ in. inside diam., may be made, while from wire up to $\frac{7}{16}$ in. diam. rings from $2\frac{1}{2}$ to $4\frac{3}{4}$ in. inside diam. may be made.

The transformer has a capacity of 100 kva. and is water cooled.

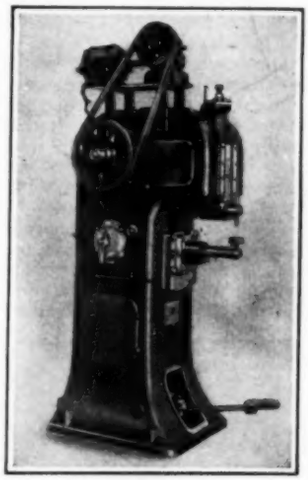
Floor space, 48x60 in.; height, 54 in.; weight, 4,500 lb., approximately.

— 248 —

Welding Press

Gibb Welding Machines Co., Bay City, Mich. [Vol.67,p.673]

An entirely new principle in spot welding is employed in the welding press which is a combination of an automatic spot welder and punch press. It differs radically from an auto-



matic spot welder, however, in both construction and in results of operation. Whereas spots are normally made in one second the welding press makes spots in one-hundredth part of a second. This increase in speed is accomplished by means of a specially-designed transformer and a precisely-timed switch.

The transformer has the characteristics of a condenser in that it discharges its current instantaneously, and aside from the increased production obtained, it makes welds without depression in the surface, warpage or discoloration. Welds can be made at the rate of 200 or more spots per minute.

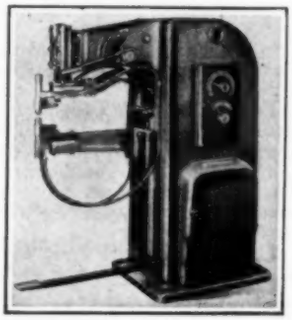
The press has a toggle action that quickly brings the welding points lightly into contact and gives a final forging pressure.

— 249 —

Spot Welder, Power-Driven, Model 275

Thomson Electric Welding Co., Lynn, Mass. [Vol.67,p.873]

Power drive is featured in the No. 275 spot welder. It has a capacity for welding two pieces of iron or steel of No. 10 gage, or slightly heavier, depending on the speed of operation. The maximum pressure at the die



points is approximately 600 lb. This pressure is adjustable by means of a spring mounted on the cam-operated pressure lever.

The power unit consists of a 1-hp. motor and a train of spur gears, all located in the base. The main driving shaft has a cam which controls the movement of the upper welding electrode. An auxiliary upper die lift is provided for by means of a hand lever.

Control of the unit is by a treadle. A remote control switch or wall contactor is also supplied with the welder. The welder can be furnished with four sets of change gears giving welding speeds of 40, 60, 80 and 100 strokes or welds per minute.

The horns are 24 in. in length and the lower horn is arranged to permit a drop of either 12 in., or 24 in., as required.

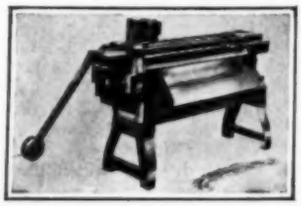
The transformer capacity is 35 kw.; floor space, 12x28x74 in.; height, 75 in.; weight, 3,100 lb., approximately.

— 250 —

Wire Measuring, Cutting and Stripping Machine, Automatic

Artos Engineering Co., 69 Wisconsin St., Milwaukee, Wis. [Vol.67,p.831]

Wires can be automatically cut to length and simultaneously stripped of insulation from both ends at a high rate of speed in this machine. It has a production of 3,600 pieces per hr. and can handle insulated wires and cords with an outside diameter up to $\frac{3}{8}$ in. Two types of machine are made, one with a maximum cutting length of 30 in. and the other of 60 in. They are furnished equipped either for belt drive or with individual motor drive.



The machine consists in principle of two traveling clamps and two tool holders. Both clamps receive the same movement, but in opposite directions. The tool holders each carry one cutting blade in the middle and two stripping blades, one on either side of the cutter.

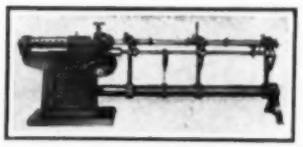
While being cut, the wire is held with both clamps, then the clamps move apart and allow the severing tools to pull the insulation from the end of the wires, after which the tool holders separate and eject the stripping.

— 251 —

Wire Straightening and Cutting Machine, Automatic, Improved

F. B. Shuster Co., New Haven, Conn. [Vol.67,p.171]

This improved automatic wire straightening and cutting machine is driven by one belt instead of three belts as formerly employed. The single belt drives direct to the arbor, o-



straightener, which is made of steel in one piece and runs upon Timken roller bearings. Power to drive the feed rolls and cutting-off mechanism is derived from the arbor through an inclosed worm and wormwheel.

The cradle into which the wire discharges may be made of any length desired and the gage actuating the cut-off mechanism is adjustable to cut any length within the range of the cradle. The cutting-off mechanism may be operated by a lever independently of the automatic mechanism.

The machine may be driven from an overhead lineshaft or motor, or may be provided with an extended motor base. The machine is built in three sizes and cuts wire up to $\frac{1}{4}$ in. in diameter.

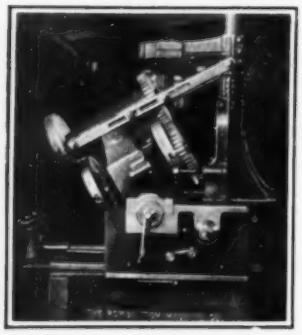
— 252 —

Cam Cutting Machine, Attachment

Rowbottom Machine Co., Waterbury, Conn. [Vol.67,p. 958]

An attachment to cut angular face-cams has been added to the universal cam cutting machine made by this company. With it such cams may be cut up to 20 in. in diameter, the size depending somewhat upon the degree of angularity of the face.

The attachment is secured above the regular tilting head of



the machine and is driven from the lathe through a pair of spur gears attached directly to one of the spindles, thus partaking of all the movements to which the machine itself is susceptible.

Adjustable extension braces to be tightened after the head has been set to the desired angle, secure the attachment to the rear supporting bracket of the machine and steady it while a cut is being made.

— 253 —

Cleaning Machine, Metal

Ideal Industrial Machinery, Winton Place, Cincinnati, Ohio. [Vol.67,p.636]

Although the cleaning machine shown was particularly designed for the purpose of cleaning drawn zinc battery shells, the same principle of

design may be applied to the cleaning of all kinds of small articles.

In this particular unit the shells are fed in by a conveyor to the first drum, in which they are submerged in a hot cleaning compound. From there, they pass into the second unit, which is a screen, where they are drained and sprayed. The third unit is a secondary rinse in in which the work is submerged in hot, fresh water.

The last unit of the machine is a hooded screen in which the work is drained and then dried by means of an air blast. The rinsing and cleaning drums are 36 in. in diam., 48 in. in length. The screens are 36 in. in diam., and 12 ft. in length.

— 254 —

Combination Machine for Turning, Wiring, and Burring Sheet Metal

Niagara Machine & Tool Works, Buffalo, N. Y. [Vol.67, p.794]

This combination bench machine is for use in sheet metal shops. It can be furnished as a single-purpose machine or with a full set of rolls. In the illustration the face turning rolls are shown mounted in the unit. It can also be supplied with rolls for burring or wiring the faces of sheet metal disks or rolls. The maximum size wire accommodated is $\frac{5}{16}$ in., and the maximum size of stock handled is No. 22 gage.

The frame is made of one piece and is extra heavy. The upper shaft is movable at the front and is pivoted at the back. The connection gears are machine cut, and are completely inclosed.

The turning, wiring or burring faces are made of high-

grade steel, hardened and polished. The gage is also made of polished steel and has a fine screw adjustment. A treadle attachment can be furnished in place of the crank screw for the upper shaft. The unit weighs about 38 pounds.

— 255 —

Cutting-Off Machine, 1½- and 3-Inch

Bardons & Oliver, Cleveland, Ohio. [Vol.67,p.523]

These cutting-off machines for bar stock and tubing of 1½- and 3-in. capacity, are operated through the entire cycle by one movement of the hand lever. On average work, not more than 3 to 5 seconds are required

for the opening of the chuck, feeding of the bar and tube, closing the chuck and getting the tool back into the cutting position. It is entirely practical to make 10 cuts per minute depending upon the nature of the material and the length of pieces to be cut.

An air-operated, hinged-collet chuck is used. The opening and closing of the collet is controlled by a valve located on the front of the head. The spindle is mounted on Timken roller bearings and is driven by a motor through a silent chain.

The roller feed is driven by a separate motor, which may be of the constant-speed type since the rolls revolve continuously.

With either size of machine the maximum length of stock that can be cut with the regular stop is 5 ft. The driving motor in each case is rated at 3 hp. and the feed motor ½ hp. Approximate floor space occupied is 11x3 ft. for both machines, while the weights are 3,250 and 5,500 lb., respectively.

— 256 —

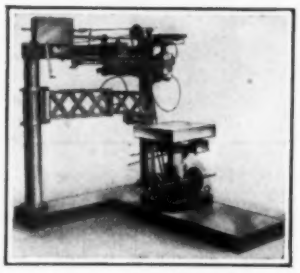
Cutting Machine, Oxygen-Jet

Hubar-Jones Corporation, 13 Astor Place, New York, N. Y. [Vol.67,p.955]

Accurate and fine cutting is possible with this machine, so that no further tooling is necessary unless a machined working surface is required. The unit is of English design.

The torch uses an oxy-acetylene flame for the heating medium and a stream of oxygen gas for the cutting medium. It will readily cut any thickness of steel up to 10 in. in depth, and can be adjusted to any angle up to 45 deg. for bevel cutting.

The unit consists of an adjustable table for supporting the work, a double pivoted arm for carrying the torch and a mechanical device for controlling



its travel. A compound traversing slide is provided with automatic screw feeds so that work can be done without the use of a templet. Manual operation is also possible. The unit will cut square or oblong holes 1½x1½ in., up to 3x3 ft. without a templet. Circular holes can be cut from 1½ to 36 in. in diam. in steps of $\frac{1}{32}$ inch.

A rotating table can be provided so that disks or holes up to 14 ft. in diam. can be cut. This table will support a load of 8 tons. A mandrel fits in the center, so that collars, cams, etc., can be cut. This mandrel is also equipped to carry a templet at the top for cutting irregular shapes. A division plate is arranged below the table to enable the operator to cut large square, hexagon, or octagon nuts and other pieces without a templet.

Ball bearings are used throughout. A ¼-hp. motor drives the entire unit. Speed control is obtained through a friction disk wheel.

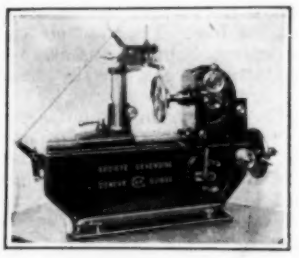
— 257 —

Dividing Machine, Drum, High-Speed, Société Genevoise

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol. 67,p.1037]

Through its American representative, the Société Genevoise d'Instruments de Physique, Geneva, Switzerland, is putting on the market Model No. 0065-1927 high-speed dividing machine for the graduation of drums. This machine was built primarily for speed rather than high accuracy, so that it may be used as a production machine where an accuracy of 1/20,000 of a revolution is sufficient.

The tracelet is permanently mounted in a horizontal position



and the work holder is tilted through 90 deg. It is thus possible to rule lines on the surface of a flat disk, as well as on a beveled dial of any angle or on cylindrical surfaces.

The pieces to be graduated may be fixed either in chucks to be secured in the hollow axle of the dividing head or on mandrels when working on a series of pieces. The graduations may be ruled at a speed as high as 100 lines per min., although 80 lines per min. is normal speed. Guaranteed accuracy of spacing of the lines at the high speed is 1 min. of arc, while at the lower speeds the accuracy may be as high as 40 or 30 sec. of arc. The machine is driven by a four-step cone pulley from a ⅓-hp. motor.

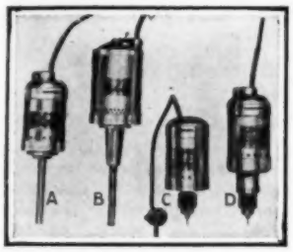
Bench space 42x13 in., height 33 in., weight 345 lb. net.

— 258 —

Electric Tools, Portable

Jas. Clark, Jr., Electric Co., Louisville, Ky. [Vol.67,p.490]

In the illustration, tools *A* and *B* are die grinders and polishing tools. Tool *A* is for light work, while tool *B* is for somewhat heavier work. These tools are well adapted for both surface grinding and internal grinding. They are primarily hand tools, but can also be clamped in a bench stand or mounted on the carriage of a lathe or planer for internal grinding.



Tools *C* and *D* are high-speed drills, particularly designed for drilling in wood. Tool *C* is for use with small bits, and tool *D* for large bits. The latter has a single-gear reduction.

— 259 —

Filing Machine, Portable

Cochrane-Bly Co., Rochester N. Y. [Vol.67,p.400]

The No. 1 portable or bench filing machine is mounted on a pedestal having casters and an elevating truck so that the

column can be raised off the floor. The machine can thus be moved easily to any suitable position for connection to a light socket, or to suit other requirements.

— 260 —

Flexible Shaft Unit, General-Purpose, "Lindy"

Stow Manufacturing Co., Inc., Binghamton, N. Y. [Vol.67, p.291]

The "Lindy" flexible shaft unit is for die sinking, vulcanizing, sanding, filing, and general finishing work on both wood and metals. The unit is for particular use with rotary files. It is furnished complete as shown with extension cord and plug and with a motor for use on 110-volt, 60-cycle, single-phase a.c. circuits.

Three speeds are available on a flexible shaft of 900, 1,800 and 3,600 r.p.m. The unit is provided with the following attachments: 4x1-in. wire scratch brush, 6x1-in. buff wheel;

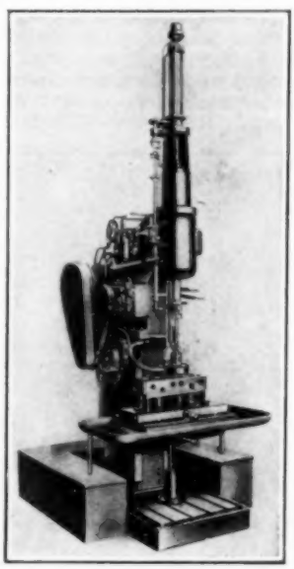
handless clamp spindle; sandpaper disk clamp spindle; ¼-in. chuck; a sanding wheel; offset angle head, and 6x1-in. grinding wheel.

— 261 —

Honing Machine, Single-Spindle, No. 249

Barnes Drill Co., Rockford, Ill. [Vol.67,p.830]

As in the case of the No. 212 single-spindle honing machine, this No. 249 machine has a reciprocating spindle hydraulically controlled as to length of stroke. The table does not move, but an air-operated table can be obtained when the 16 in. of vertical spindle travel will not permit the lifting of the hone out of the work. The particular feature of this unit over the No. 212 is the fact that four or eight quick-change speeds are available, or one speed only can be obtained. Ball bearings are used throughout as before.



This particular machine will handle bores up to 12 in. in diam. An Oilgear pump is used to furnish power for the reciprocation of the spindle and may be adjusted to produce 40 to 50 strokes per minute. Standard spindle speeds are 128, 180, 250, and 354 r.p.m. under ordinary conditions.

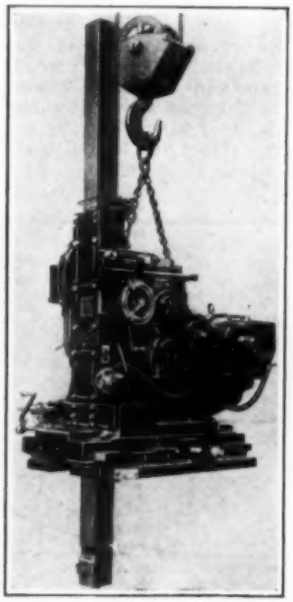
Floor space 56x32 in.; overall height 11 ft. 9 in.; weight with motor 4,300 lb. net.

— 262 —

Keyway Cutter, Portable, 72-Inch Stroke

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol.67,p.1042]

In the illustration is shown a right-side view of a portable keyway cutter having 72-in. of cutting stroke. Because of the extended drawbar, the unit is



shown suspended from a crane hook. The position of the floor line is obvious.

This portable keyway cutter has 8 in. of out and in feed. The smallest hole the ram will pass through is 10 in. in diam. Seven cutters, ranging in size from 2¼ to 4 in. wide, inclusive, with variations of ¼ in. are furnished with the machine.

The ram cuts on the upward stroke, drawing the work against the base of the machine.

— 263 —

Lapping Head and "Newgrit" Abrasive

Bethel-Player Co., Inc., Westboro, Mass., now Norton Co., Worcester, Mass. [Vol.67,p.369]

The lapping head is designed to use the new form of abrasive that has been developed by this company known as "Newgrit."

The head is driven through a full-floating universal joint that allows it to align itself with the hole being lapped.

The head is hollow, and contains a spindle that carries two hardened steel cones by which the active members of the head are supported. The end movement is imparted to the spindle by turning a knurled sleeve.

The new abrasive material consists of a metallic alloy in which the abrasive is embedded throughout the structure. It can be cast in any desired shape and machined with diamond tools to accurate dimensions. When worn out beyond the limits of size, Newgrit laps are replaced in a few minutes by new laps of correct size and ready for use. It is claimed that with this abrasive no adhesive sludge is formed upon the tool or work.

— 264 —

Pipe Cutters, Heavy-Duty, 4- and 6-Inch, Geist

Landis Machine Co., Waynesboro, Pa. [Vol.67,p.515]

The Geist Manufacturing Co., Waynesboro, Pa., has added to its line of high-production, heavy-duty roller pipe cutters a 4- and a 6-in. size. The above company is the sole agent for the sale of these machines. The No. 4 machine has a range from 1½ to 4 in., or down to ½ in. with a special attachment. The standard range of the No. 6 machine is from 3½ to 6 in. inclusive, or down to 1 in. with an attachment.

The cutter is made from heat-treated tool steel as are the rollers, which are carried on roller bearings.

The length gage handles pipe up to and including 40 in. The gage arm is a heavy forging and will resist flecture. The machine throughout is powerful in construction and rigid in design. All spindles and shafts are ground and run in bronze-bushed bearings.

A 3-hp. motor is required for the No. 4 machine while a 5-hp. motor is required for the No. 6. When motor driven, the power is transmitted from the motor to the machine by means of gears.

— 265 —

Scraper, Power, Improved

Anderson Bros. Manufacturing Co., Rockford, Ill. [Vol.67, p.173]

The power scraper is claimed to be simple in construction, light in weight, and rugged enough to stand up against hardened usage. It is handled like

a hand scraper, and although its power is equal to that of several men, it can be guided about the work as easily as a hand tool.

The complete unit includes a floor stand with an elevating truck, so that it can be raised upon wheels for portability. Drive is by means of a ¼-hp. motor, and movement of the scraper is through a rack and pinion.

The control for operating the scraper ram is sensitive in that only ⅛-in. forward movement is necessary to cause a forward stroke at the rate of 60 ft. per min. The ram returns at the rate of 90 ft. per min. The stroke can be varied from a fraction of an inch up to within the entire length of the ram. A working radius of 6 ft. is available.

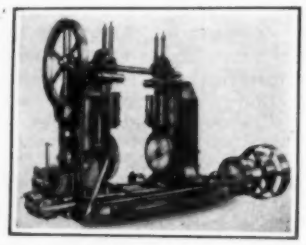
— 266 —

Seamer, Double-End, Horizontal, No. 309

Niagara Machine & Tool Works, 697 Northland Ave., Buffalo, N. Y. [Vol.67,p.680]

For the manufacture of grease drums and light steel containers in a wide range of sizes, the No. 309 horizontal double-end seamer was developed. It seams both ends of the drum simultaneously, and a production of 300 complete small diameter drums per hour is claimed.

The main spindles carrying the chucks are mounted on Timken roller bearings, and the individual first- and second-operation seaming rolls also rotate on roller bearings. The motion



of the right-hand column that clamps the drum and the motion of the roll cams are controlled by Johnson clutches. Rotation of the seaming chucks is also effected through a large single-disk clutch.

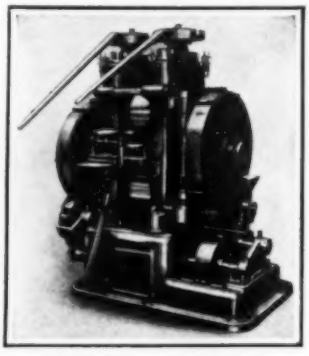
— 267 —

Rolling Mill, Four-High

Standard Machinery Co., Auburn, R. I. [Vol.67,p.484]

Rolls of small diameter are featured in the four-high rolling mill designed for rolling thin-gage material. The working rolls are made 1½ in. in diam. or larger, depending on the thickness of stock to be reduced.

In the mill shown, the baby rolls are 3 in. in diam. by 8 in. face. They are backed up by two rolls 16 in. in diam. These backing up rolls are mounted



on roller bearings and are friction driven from the small rolls. The larger rolls help radiate the heat from the baby rolls.

In comparison with the conventional type of two-high mill or with mills having large-diameter working rolls, there are claimed to be the following advantages: The material can be reduced in approximately one-half the number of passes; the small rolls do not harden the material and consequently annealing is reduced; the stock is uniform in thickness; and the power is reduced.

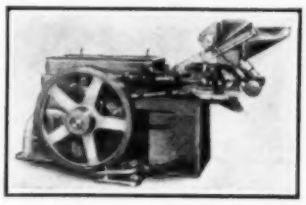
— 268 —

Trimmer, Bolt-Head, Automatic

Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.67,p.329]

The outstanding features claimed for the automatic bolt head trimming machine are: Complete separation of chips and trimmed blanks; higher speeds; positive ejection of all trimmed blanks through the die; ability to trim any length without special tooling; new design of rotor hopper feed; improved transfer mechanism for carrying the blanks from the feed chute to the tools; accessibility for setting up and adjusting; and provision for either belt or direct-geared, inclosed motor drive.

A rotor in the hopper picks up the blanks and deposits them in the chute, from whence they



slide to a finger on the transfer slide which carries them to the center of the machine. The punch is fixed in the frame, and the die in a block on the reciprocating gate. The work is trimmed by pushing the die over the projecting head of the blank. After trimming, the blanks are knocked out of the punch and through the receding die.

The capacity of the machine is bolts ⅜ in. in diam. by ⅜ to 4½ in. long. Production is 115 per minute.

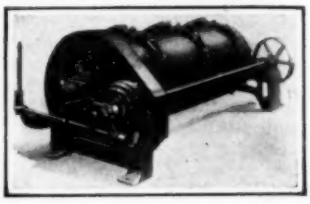
Floor space, 108x57 in.; weight 7,500 lb. without motor.

— 269 —

Tumbling Mill

Whiting Corporation, Harvey, Ill. [Vol.67,p.293]

The tumbling mill shown features several important improvements in this class of equipment. Emphasis is placed on the door clamp, which consists of two



or more pairs of holding bars having toggle links or claws at their outer ends engaging hooks riveted to the barrel at the edge of the door opening. The links provide a toggle action that clinches the door edges tightly against the shell. The door opening extends the full length of the barrel.

The shell of the mill is made of open-hearth steel and the ends of the barrel are heavy castings ribbed on the inside. Each head is lined with an open-hearth steel plate perforated to permit free passage of the exhaust. The opening in the trunnions is made in the form of a venturi orifice. On leaving the trunnion the dust-laden air enters a dust box in which the heavier grit is deposited.

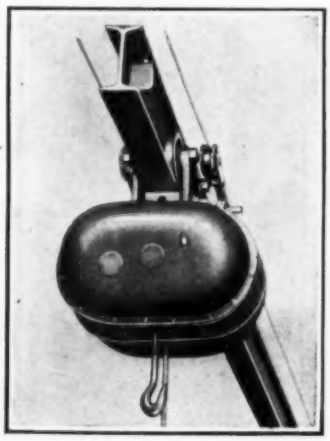
Material Handling Equipment

— 270 —

Electric Hoist, ¼ Ton, "Quick-Lift"

American Engineering Co., Philadelphia, Pa. [Vol.67,p.557]

The "Quick-Lift" all-steel electric hoist of ¼-ton capacity is a high-speed unit with a pressed steel frame and chrome-manganese steel gears and shafts. It features in addition



ball bearings throughout, non-spinning hoisting rope, oil-bath lubrication, push-button control, and upper and lower limit switches. All working parts are fully inclosed.

The hoist weights 200 lb., and is made in two types: plain trolley and hook suspension. The plain trolley type requires 16 in. and the hook suspension type 18 in. of headroom.

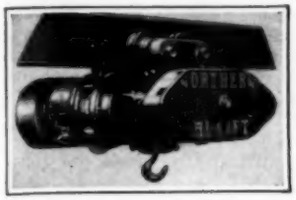
— 271 —

Hoists, Improved, "Hi-Lift"

Northern Engineering Works, Detroit, Mich. [Vol.67,p.872]

Compact design, rigid construction, ready accessibility and high efficiency in operation together with high hook lift are some of the features stressed by the manufacturer of the improved series of "Hi-Lift" hoists.

The hoists are mounted on plain I-beam trolleys and are provided with two brakes, a motor check brake attached to the end of the hoist motor arma-



ture, and a mechanical brake in the hoisting gear train.

Another feature is the one-piece unit casting used to maintain alignment and arranged so that the shroud fits over the ends of the drum, thus preventing the hoisting rope from passing over the ends. The hoist is suspended by a substantial cast-steel hanger piece.

Two stops are provided at both limits of travel of the load block.

The gear covers are split horizontally so as to permit ready inspection or removal of the gearing.

— 272 —

Hoist, Model K, "Cyclone"

Chisholm-Moore Manufacturing Co Cleveland, Ohio. [Vol. 67,p.793]

As in the previous model of "Cyclone" hoist, the Model K is constructed on the gyrating-yoke principle. The improved model is said to have a working efficiency of 90 per cent as against 80, and a length of life without repairs considerably longer than that of the older model.

Among the improvements was the addition of anti-friction bearings on every rotating shaft. In previous models the rollers in the four eccentric roller bearings were loose, and had to be carefully fitted when assembled. In the Model K unit, these roller bearings are built in one complete set. The lift wheel is made of special alloy steel to give long life.

The entire mechanism of the hoist is inclosed in a dust-proof oil tight housing. All parts are made interchangeable. The hoist is light in weight.

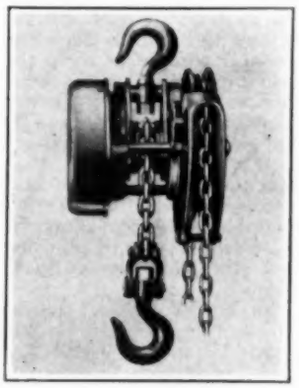
— 273 —

Hoists, Chain, Spur-Geared "Ideal"

Dickerman Hoist Manufacturing Co., 872 East 72d St., Cleveland, Ohio. [Vol.67,p.830]

This line of hoists is of the planetary-gear type. It is designed so that the downward speed of the load is always in direct proportion to the rapidity with which the operator overhauls the hand chain.

The hoist is made almost entirely of steel including the load wheel, suspension plate, top



hook, crosshead, load hook shackles and driving mechanism. The load chain is electrically welded and each link is formed to dies to secure uniformity. Ball bearings are used wherever possible and are protected by armored felt washers against the entrance of dirt.

The Ideal hoists are furnished in capacities from ½ to 10 tons with lifts varying from 8 to 12 ft. The pull on the hand chain to raise the rated load varies from 47 to 132 lb. The hoist is also made in 16-, 20-, 32- and 40-ton sizes.

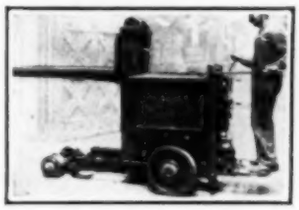
— 274 —

Tructor, Tiering, 2-Ton

Elwell-Parker Electric Co., Cleveland, Ohio. [Vol.67,p.175]

This 2-ton, light-duty electric tiering tructor is designed to handle skid loads or to elevate the load from the floor 4 to 8 ft. when tiering or delivering goods to trucks or car platforms.

The machine is of all steel construction and is built on the interchangeable parts basis. The power plant comprises an inclosed Elwell-Parker motor, and worm and wheel drive with brake. The braking and power applications are separate to pro-



vide for incline operation. Drum-type controllers are used to control travel of the truck and the lift of the platform. Automatic trips are used.

The platform is a solid plate of steel with edges bent into a skirt. The main frame is built of angle channels and heavy gusset plates. The battery compartment will accommodate practically any size of batteries that the service may require.

Alemite lubrication is used.

— 275 —

Trailer, Steel, With Rubber Tires

Clark Tructractor Co., Battle Creek, Mich. [Vol.67,p.253]

Safety and speed of operation are claimed for the steel trailer with rubber tired wheels. The trailer has a steel platform 3 x 6 ft. and with the top 14 in. from the ground. The adjustable racks are interchangeable for use on either the ends or the sides.

The casters swivel on eighteen 1-in. steel balls while a Timken bearing is used at the kingpin location. The wheels are mounted on solid roller type bearings of special design. All

bearings are equipped with Alemite fittings. Rubber tires are furnished on all four wheels. An automatic coupler is featured.

Weight 550 lb.

— 276 —

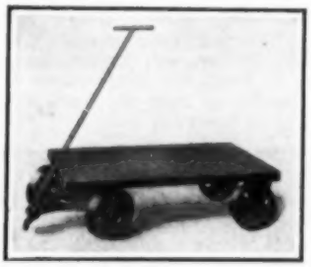
Trucks, Steel, "Hallowell"

Standard Pressed Steel Co., Jenkintown, Pa. [Vol.67,p.293]

The "Hallowell" steel trucks can be furnished in 8 wheel styles and 40 different body designs for one chassis. The unit is of all steel construction.

Interchangeability is featured. A truck with wooden stakes can be changed into one with slatted steel racks, bar handles, plain steel stakes, or combinations of these as desired. All kinds of fixtures fit the corners of these platforms without modification.

The running gear of the standard chassis consists of four semi-steel wheels, of which the two larger ones are mounted on a fixed axle, while the two smaller ones are mounted on



casters. The wheels can be furnished with either plain, rubber or canvas-cushion treads and with plain or roller bearings.

All styles of the truck are made in several sizes and in two capacities; 1,000 and 2,000 lb. respectively.

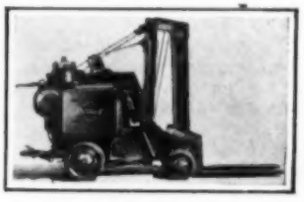
— 277 —

Electric Truck, Tin-Plate

Baker-Raulang Co., Cleveland, Ohio. [Vol.67,p.516]

This truck, specially designed for handling tin-plate has a capacity of 5,000 lb. of sheets. It is compact enough to be driven inside the average box car.

The driving axle is of the full-floating type with a worm gear reduction. The Baker series-type driving motor is mounted on a cradle cast integral with the axle housing. Both front and rear axles have the knuckle pivots in line with the tire centers to provide easy steering. The controller is the standard Baker type, and an automatic switch of the quick-



break type interlocked with the controller is also provided as a safety feature.

The hoist consists of two drums either of which may be driven by a series-wound motor. One cable hoists the carriage and forks while the other tilts the superstructure in order to bring the points of the fork prongs into contact with the floor. Limit switches are provided to open the hoist motor circuit at both limits of travel of the carriage and the superstructure.

— 278 —

Lift Truck "Red Streak," Ball Bearing

Stuebing Cowan Co., Cincinnati, Ohio. [Vol.67,p.996]

Ball bearings on the wheels are featured in the "Red Streak" single-side lift truck. Eight heavy-duty ball bearings are used, two to each wheel. The truck shown will handle loads up to 5,000 lb. Little effort is required to start the load and to keep it moving.

Woodworking Machinery

— 279 —

Jointer, 8-Inch

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.67, p.486]

The 8-in. jointer features the motor on the arbor. The machine is shown mounted on a portable-type pedestal base, but it is also supplied as a bench-type machine.

The rabbetting groove in the rear table and the vertical adjustment of the front table

make it possible to rabbet up to ½ in. Both front and rear tables may be adjusted.

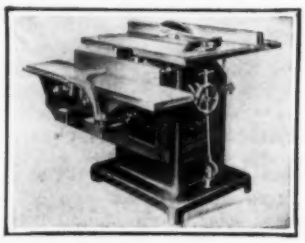
The machine is equipped with a ball-bearing, repulsion-induction motor mounted on the arbor and carrying three knives 8¼ in. long. The machine has a 24-in. front table and an 18-in. rear table.

— 280 —

Universal Saw and 8-Inch Jointer, Combination, "Union," No. 128

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.67, p.600]

This machine is a single portable unit made up by combining the motor-on-arbor tilting saw table and the 8-in. jointer described above. Each unit is said to be as efficient as a separate machine would be and the construction and operating features of each are equally applicable to this combined unit. There is nothing to lock or unlock when changing from operating the one machine to the other. The saw is dropped to its lowest position and the slip coupling moved to engage the coupling on the jointer when the use of that machine is required.



A single motor is used to operate either of the spindles and is equipped with ball bearings. Ordinarily a motor for connection with a lamp socket is furnished, but a 1-hp. motor for use on power lines is also supplied as standard equipment. When desired, a 3-hp. motor can be furnished for heavier work.

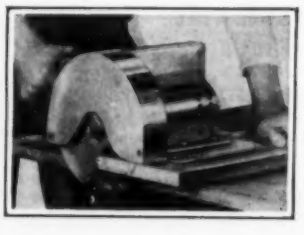
The combined unit is mounted on a portable truck type pedestal base. The machine weighs 890 lb. net.

— 281 —

Saw, Electric, Portable

Lee Pattern Co., 130-13th St., Milwaukee, Wis. [Vol.67,p.74]

The portable electric saw shown will cut lumber up to 1 in. in thickness. One of the chief claims made for the machine is its lightness and convenient size. It weighs 6 lb. All parts are made from stampings, resulting in low cost.



The saw is equipped with an automatic guard, and, if necessary, this guard can be changed for the use of a left-handed workman. A patent ridge is provided for gripping the machine in a vise.

— 282 —

Saw Bench, Motor-on-Arbor, "Union"

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.67, p.168]

The driving motor is mounted directly on the saw arbor and is designed to operate from any lamp socket. The saw will cut stock up to 2½ in. in thickness. It is also possible to equip the machine with a special 1-hp. motor to operate from a power line and with larger saws so as to provide for 3½ in. depth of cut.

The machine is equipped with a 30x34-in. table fitted with a removable throat, to allow the use of dado heads and grooving saws. the table tilts up to 45 degrees.

The cross-cut gage can be used on either side of the saw as can the ripping gage. The saw guard protects the operator

at all times and can be adjusted for any thickness of stock. A splitter guard is also part of the equipment.

— 283 —

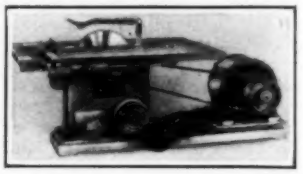
Saw, Bench, "Monarch"

American Saw Mill Machine Co., Hackettstown, N. J. [Vol. 67,p.791]

The "Monarch" ball-bearing bench saw is regularly furnished with a sub-base and motor drive, but may also be driven from an underneath countershaft. The motor regularly furnished is rated at ½ hp. for use on single-phase 110- or 220-volt, 60-cycle circuits.

The table measures 18 x 24 in. It tilts to any angle up to 45 deg. and has a rise of 2¼ in. A combination rip and cut-off saw, 8 in. in diam. is regularly furnished.

The table is furnished with the necessary gages. The ripping gage opens from the saw



9½ in., and a graduated bar indicates the distance from the saw. An aluminum guard and steel splitter are furnished with each machine. The saw mandrel is mounted on ball bearings.

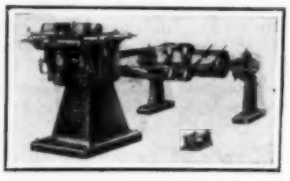
The height of the machine with sub-base from the top of the table is 12¼ in. The machine base measures 6 x 11 in. and the sub-base 9 x 29 in. The shipping weight of sub-base and motor is 240 pounds.

— 284 —

Shaping Machine, Double-Spindle, No. 723

Defiance Machine Works, Defiance, Ohio. [Vol.67,p.169]

The shaping machine was designed especially for tapering and re-shaping adz, hammer and hatchet handles or similar articles after they have been rough



turned. The machine is belt driven.

The table carries a steel form or slide to guide the travel of the saddle and contour strips to govern the shaping between the cutter heads.

The main form has adjustable tracks on each side giving a capacity to shape material up to 12 in. long. The maximum taper provided is ½ in. on each side. The machine will regularly accommodate stock up to 3 in. thick and from 1 to 3½ in. in width.

Square steel cutterheads are used, carrying four knives, 3 in. wide, with chip breakers. Regular equipment includes two floor stands with pulleys and belt shifting apparatus.

Floor space 54x78 in.; weight 1,100 lb.

Balancing, Gaging and Testing Equipment

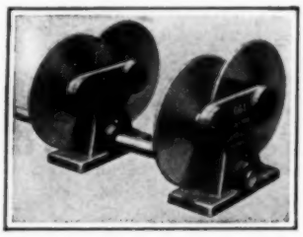
— 285 —

Balancing Machine, Static, No. 661

J. A. Fay and Egan Co., Cincinnati, Ohio. [Vol.67,p.368]

This portable static balancing machine, mounted on ball bearings, can be set up at any place and no leveling is required. All parts to 100 lb. in weight, such as pulleys, flywheels, fans, cutterheads for woodworking machines and the like, can be balanced.

The revolving plates and their axes are made in one piece of steel, case-hardened and ground



in position. Deep groove precision ball bearings are used. The balance stand may be placed any distance apart or as close as 3 in. The unit is regularly furnished, however, with an adjusting bar for 24 in. between plates. A sensitivity of ⅛ oz.-in. is claimed for this type of machine.

— 286 —

Tire-Balancing Machine, Automatic Weighing, Olsen-Lundgren

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,p.402]

The machine is for balancing automobiles and truck tires with accuracy on a production basis. For operation the tire is mounted on an adapter connected to the arbor, the arbor itself forming a

scale. The tire is free to move on the shaft through ball bearings, so that it will come to rest at the bottom where the greatest weight is located.

The tire and adapter is then fixed with the central shaft, which constitutes the scale, and is turned 90 deg. so that the dial will automatically indicate any static unbalance in ounce-inches. The tire can also be turned on the shaft by power, and the amount of unbalance will be indicated automatically on the dial. The angle of unbalance can also be noted.

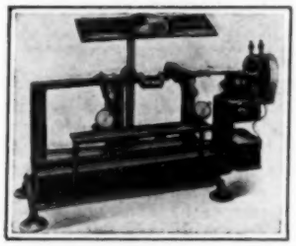
The dial gives direct readings and no corrections are necessary for different weights of tires.

— 287 —

Balancing Machine, Dynamic, Centrifugal, Olsen-Lundgren

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,p.994]

The Olsen-Lundgren centrifugal dynamic balancing machine is made in various sizes to suit the work. It differs from previous models in having two stands



for holding the work and measuring the effect of the unbalance.

The stands are provided with two rollers each, on which the work rests and revolves. Behind each stand is a stop pivot which controls the backward movement of the stand, while any forward movement causes an electrical contact to be made which is transferred through a high-tension vibrating coil to a dial indicator, which shows the position of the unbalance.

A screw and weight is provided on each stand together with a handwheel and graduated dial for adjustment until the cessation of sparks indicates a balanced condition. The amount of unbalance can be read directly in ounce-inches from the dials.

The test piece is driven by means of a universal coupling. The machine size is adapted for various lengths and diameters of work between given ranges, as the position of the work stands are adjustable for length and the rollers are adjustable for diameter of work.

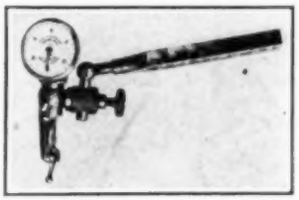
The readings are taken in two planes on the work, usually the bearing positions in the case of shafts. For transferring these readings to any other position of the work, two direct-reading transfer instruments are furnished, one for each stand.

— 288 —

Indicator, Model F, "Last Word"

Henry A. Lowe, 1874 *E. 66th St., Cleveland, Ohio.* [Vol.67,p.720]

Measurements in practically every direction can be made with the Model F "Last Word" indicator. The universal shank



supplied allows it to be swung through a complete circle at any angle.

The indicator proper has a tubular swiveling body held tight in a spring clamp so that it can be turned to the right or left, and above or below the shank. The contact piece can be interchanged for one of different shape, or can be pushed around to any desired position.

Every part of the indicator is made of hardened steel with the exception of the bezel, which is of nickel silver. The range of the instrument is 0.030 in. in either direction. The ratio of movement between the contact piece and the end of the pointer is 90 to 1. Without the shank the unit weighs 1¼ ounces.

— 289 —

Indicator, Dial, Micrometer

B. C. Ames Co., Waltham, Mass. [Vol.67,p.796]

The No. 100 micrometer dial indicator has a dial 2½ in. in diam. and is graduated in increments of 0.0001 in. It reads plus or minus from zero.

The measuring spindle has a travel of 1/10 in., causing the pointer to make ten full revolutions over the dial. Because of the unusually large amplification and the consequent wide spacing of the divisions on the dial it is possible to estimate fractions of "tenths."

Although the instrument shown has a plain non-adjustable dial, it is also made with a movable bezel for correcting the zero point, and with a second hand to indicate the number of turns made by the large pointer.

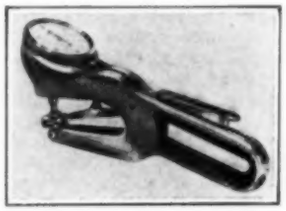
— 290 —

Dial Gage for Sheet Metal

B. C. Ames Co., Waltham, Mass. [Vol.67,p.790]

The dial gage is for use in mills where sheet metal is rolled to especially close limits of thickness or in fabricating plants where the exact thickness of the material employed is a matter of major importance. The design of the holding frame and the disposition of the dial thereon are intended to facilitate the application of the gage to the work and to enable the operator to take the reading without moving from his normal position.

The frame of the instrument is designed to be easily grasped.



The grip of the operator's hand depresses the trigger and thereby opens the gap between the measuring spindle and the anvil to its fullest extent. When the grip is released, the spring of the indicator brings the measuring spindle into contact with the work.

The gage has a capacity for material up to ¼ in. in thickness. The dial reads directly in quarter-thousandths.

— 291 —

Micrometer, No. 11

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.67,p.173]

The No. 11 micrometer was particularly designed to measure odd-shaped pieces having projections and recesses. One of the features of the tool is adjustment for wear on its measuring surfaces.

The opening in the frame is enlarged by an improved shape of the frame at its anvil and spindle ends. The small size of

the frame at its anvil end is also said to adopt the micrometer for measurements in narrow slots.

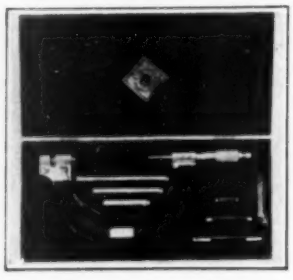
— 292 —

Micrometer, No. 45

J. T. Slocomb Co., Providence, R. I. [Vol.67,p.1040]

Any measurement up to 4 in. can be read directly in numerals on the No. 45 micrometer which is intended especially for use in garages and by motor mechanics in general.

The dial from which the figures are read is the regular direct-reading device applied by this company to other tools of



like nature and consists of a row of three figures appearing in small aperatures located in the spindle end of the bow in a position to be read conveniently. The bevel edge of the sleeve or thimble carries the usual 25 divisions, so that half or quarter thousandths are easily estimated with reference to the zero line on the barrel.

At the opposite end of the bow, removable anvils are clamped. Four of these anvil pieces are provided to cover the range of measurement. In each case the anvil abuts against an adjusting screw, which is used to correct for errors introduced by wear.

To assure accurate placing of the anvils three end measuring gages, 1, 2 and 3 in. long respectively, are provided.

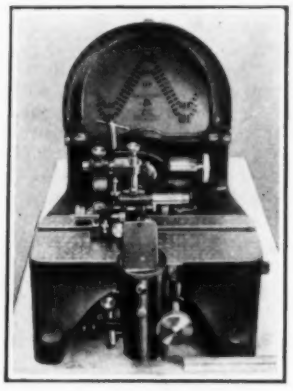
The set is packed in a wooden case.

— 293 —

Universal Stage for Hartness Comparator

Jones & Lamson Machine Co., Springfield, Vt. [Vol.67,p.374]

The universal stage for the Hartness comparator is intended to accommodate a wide range of diameters and pitches of screws and taps. It is made up of a frame carrying rolls on which the threads are supported at the pitch line, an adjustable back stop for positioning the



screw on top, and a spring plunger for holding the screw down onto the rolls and back against the stop.

With the adjustments provided, it is possible to test the pitch diameter, lead and form of screws from ¼ in. to 1¾ in. in diam. and of any pitch from 6 to 28. It is claimed that any of these measurements can be made as quickly as the pitch diameter can be checked with a snap gage.

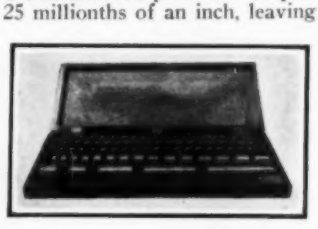
— 294 —

Microgages, Set M 81

Van Keuren Co., 12 Copeland St., Watertown, Mass. [Vol.67, p.487]

The set of shop-working gage blocks contains 81 gages and includes sizes of blocks from 0.050 to 5 in. The set makes possible any combination in ten thousandths of an inch from 0.2 up to the range of the set.

These gages are held within a tolerance of plus zero to plus 25 millionths of an inch, leaving



an average wear allowance of about 15 millionths of an inch. For this reason they are especially adapted for use on production work, particularly around grinding machines where wear is likely to make the gage block prematurely undersize.

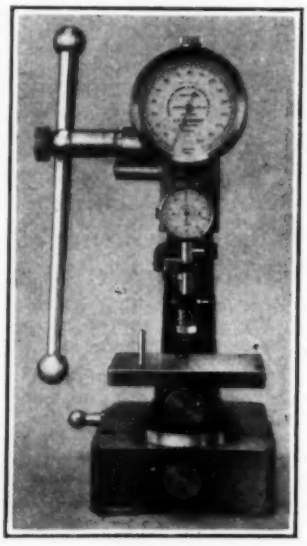
— 295 —

Hardness Indicator, Constant-Diameter, "Monotron"

Shore Instrument & Manufacturing Co., Van Wyck Ave. and Carll St., Jamaica, N. Y. [Vol.67,p.562]

The instrument is a static mechanical pressure machine acting on a small diamond ball impressor through a specially designed pressure scale. The resulting depth of impression under load is measured by a standard micrometer gage. The successful operation of the unit has been made practical by the introduction of a compensator device on the indicator that serves to correct the hitherto unavoidable errors due to contraction of the parts in the machine and the diamond itself when under strain.

The comparative hardness of the material is measured in terms of the pressure necessary to produce an impression 9/5000 in. in depth with a 2 mm. diamond ball point. Special scales may be applied to the instrument to read in terms of Scleroscope



and Brinnel hardness numbers, or unit stress scales may be used. Pressure is furnished through a simple plate spring loaded as a beam in the center and carried on roller bearings.

By means of a flat end punch of constant diameter it is possible to measure the comparative ductility of metals. In this case a constant pressure is applied and the depth of impression is the variable factor. It is also possible to measure the depth of hardness.

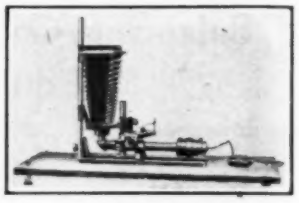
Capacity between the base and the impressor point, 7 in.; weight 61 lb.

— 296 —

"Metallurscope," Model MC, with Camera

E. Leitz, Inc., 60 East 10th St., New York, N. Y. [Vol.67, p.599]

The "Metallurscope" Model MC serves for microscopical examination of metal specimens and is intended for industrial laboratories and work shops. It provides both visual observation of the specimen and means for photographing it.



The stage is situated above the objective of the microscope, and the metal specimen, with polished surface downward, is placed upon the glass diaphragm. By turning the microscope 180 deg., large objects placed upon the base plate can be examined direct. In both these positions, the image can be recorded by means of the camera.

— 297 —

Pyrometer, Optical, Improved, "Pyro"

Pyrometer Instrument Co., 74 Reade St., New York, N. Y. [Vol.67,p.713]

Improvements and simplifications have been made in the "Pyro" optical pyrometer which was designed for particular use in measuring the temperature of small glowing bodies, not inclosed and not having the characteristics of a black body, or for the measurement of the temperature of pouring metal.

The instrument is used like a telescope and it magnifies the object four times. The object appears in its actual colors and is matched against a test mark illuminated by a standard electric lamp. Matching is done by means of a circular graduated

filter having a scale that reads direct in degrees. The normal range of the instrument is 2,000 to 3,200 deg. F. It is claimed that temperature variations of a very close range can be detected.

— 298 —

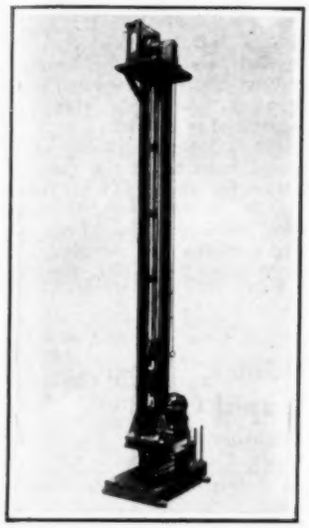
Impact Testing Machine, Automatic, Progressive and Repeat

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,pp.486 and 636, *Erratum*]

The impact testing machine is designed for testing gear teeth by impact, but can also be

used for testing other materials. The hammers used are 20 and 40 lb., and the machine is arranged for a 1 ft. minimum drop and 10 ft. maximum. By blocking up the base, gears up to 2 ft. in diam. can be tested.

The column consists of two steel channels on which are mounted cast-iron slides. A roller chain, motor-operated,



automatically lifts the hammer and trips it, causing it to drop 1 in. higher at each blow. The height is read directly in inches on a steel tape. The hammer can be adjusted by hand to start at any specified height.

The hammer is positively caught on the rebound by the chain and no repeat blows are delivered.

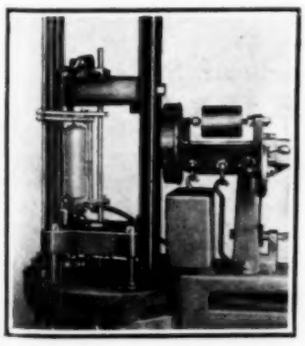
— 299 —

Stress-Strain Recorder, Olsen-Smith

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,p.409]

The Olsen-Smith stress-strain recorder may be attached directly to the test specimen, giving a graphic stress-strain diagram, from which the modulus and elastic limit may be accurately secured.

The chief purpose of the apparatus is to record on paper the relation of the elongation



to the load, and the result is a highly magnified stress-strain diagram. The instrument is portable and is clamped to both ends of the test specimen.

As the specimen elongates, the movement sets in motion a magnetic motor at the bottom of the apparatus, automatically rotating the drum an amount in direct proportion to the elongation of the specimen.

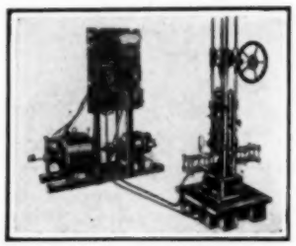
— 300 —

Testing Machines, Alternating-Stress, Haigh

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,p.558]

This company is the sole American representative of the Haigh alternating-stress testing machine built by Bruntons, Musselburgh, Scotland. The chief purpose of the machine is to determine the fatigue limits of metal.

The machine is capable of making rapid tests at high frequencies of reversal. An important advantage claimed is the uniform distribution of the stress across the full section. The range of stress is indicated on



a special meter mounted on the wall behind the testing machine. This range can be varied up to a maximum of 1½ tons.

The action of the machine depends upon a pair of electro magnets supplied with a two-phase current from a small alternator. The frequency of reversal is governed by the speed of the alternator, and is usually 2,000 stress cycle per min. The amount of stress is varied by changing the voltage of the alternator.

The standard equipment includes a switchboard carrying a combined stress meter and differential ammeter, a main switch with automatic cutout and two regulators. It also includes an alternator.

— 301 —

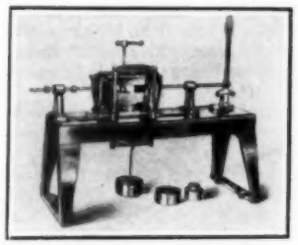
Sharpness Tester, Olsen-Honda

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. [Vol.67,p.601]

The sharpness testing machine was designed by Prof. Cotaro Honda, of the Imperial University, Sendai, Japan, and is for the quantitative measurement of the cutting of cutlery.

For making tests of blades or sharp instruments, the cutting edge is brought into contact, under a definite pressure, with a narrow band of sheets of paper, and a definite amount of forward and backward motion is given the blades. The number of sheets cut during the motion is taken as the "cuttingness" of the instrument.

Cuttingness has only a relative meaning and hence, for the accuracy of the experiment, it



is only necessary to use the same kind of paper. A standard grade of paper is used and the band consists of several hundred sheets.

With this machine both the initial cuttingness and the durability can be measured accurately. After the initial figure is obtained, eight more cuts are taken without counting the sheets cut, then a new measurement is taken. Similarly, the twentieth, thirtieth, etc. are measured and a curved plotted showing the decrease in cuttingness.

— 302 —

Test Benches, Additional Sizes

Hobart Brothers Co., Troy, Ohio. [Vol.67,p.833]

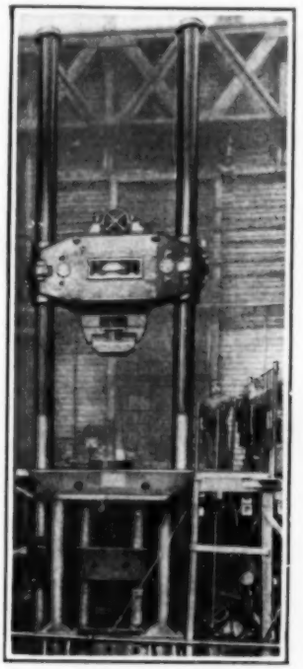
Announcement is made of the addition of two sizes to this company's line of test benches, the 1½- and 2-hp. size. These two benches have the identical features of the 1½-hp. outfit which was described on page 212, Vol. 64, of the *American Machinist*. The benches are used in determining ignition, starting, and lighting troubles.

— 303 —

Testing Machine, Universal, 1,000,000 Pound, Emery-Tatnall

Southwark Foundry and Machine Co., Philadelphia, Pa. [Vol.67,p.638]

What is claimed to be the largest universal testing machine of its kind ever built is the joint product of A. H. Emery Co., Emery-Tatnall Co., and Southwark Foundry and Machine Co. It is intended for tensile, transverse and compression tests on all kinds of railway equipment. It has a



capacity up to 1,000,000 lb., has 7 ft. clear space between the columns, and will take test specimens up to 19 ft. high.

The base of the machine is a heavy steel casting, having four columns heavily reinforced with cross beams on which rests the working platform. Four hydraulic cylinders are arranged in the base, two for compression and two for tension. These have a total movement of 12 inches.

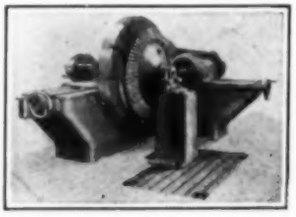
The oil pressure in the hydraulic cylinders is furnished by a Hele-Shaw rotating cylinder pump, motor driven. The straining system consists of a lower crosshead firmly attached to the two side columns, and a top crosshead carrying the weighing system, which is adjustable on the two columns through motor-driven nuts.

— 304 —

Gear Testing Machine, Bevel, 90-Inch

Gleason Works, Rochester, N. Y. [Vol.67,p.882]

Quietness and proper tooth bearings of bevel gears up to 90 in. in diam. can be tested on this machine. The spindle heads are mounted on slides and each head is horizontally adjustable by means of a handwheel graduated to 0.001 inch.



The spindles are accurately mounted in the same plane and intersect at 90 deg. They are fitted with specially matched ball bearings. The arbors are held in place by draw bolts. A steady rest is furnished with the machine as an outboard support for heavy gears. It can be adjusted to take care of any gear within the capacity of the machine.

The unit is driven by a 10-hp. motor mounted on the drive head. The spindle may be revolved in either direction. A friction brake on the driven spindle permits the operator to test the gears under load.

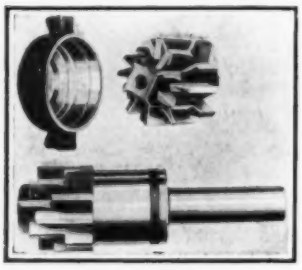
Small Tools

— 305 —

Cutter, Multi-Diameter

Eclipse Counterbore Co., Detroit, Mich. [Vol.67,p.332]

A special line of multi-diameter, or multiple-operation, cutters designed to bore or face from two to eight surfaces at the same time is being made. One of the cutters, with a sample of the work done, is shown in



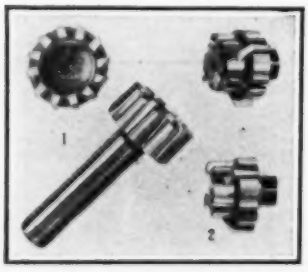
the illustration. The design of the cutter enables it to be shortened without losing its form. It is thus possible to machine the various surfaces at one operation without resetting. The tool is intended for production work of boring, facing, and chamfering, and can be made specially to accommodate a wide variety of work.

— 306 —

Cutters, Inserted-Blade

Gairing Tool Co., Detroit, Mich. [Vol.67,p.398]

Multiple-blade reamers and boring tools are being made by this company. The blades are held in the body by friction. A double angle causes the high-speed steel blade to tighten itself in place and have a bearing on all sides.



A large range of adjustment is possible by placing shims in the slot at the bottom of the blade. When the outside diameter of the blades wear down, the shim brings the blade up on the diameter and out on the length. The outside diameter of the tool is ground after shimming.

The bodies that hold the blade are made from vanadium steel. The tools are made in any size from 1¼ in. in diam. up.

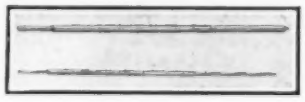
— 307 —

Boring Tools, Diamond

Kelly Reamer Co., Cleveland, Ohio. [Vol.67,p.994]

The two diamond borers shown in the illustration are for finishing camshaft and crankshaft bearings of automobiles.

Because of the type of cutter employed and the accuracy to be maintained, a special unit was developed to hold the diamond, known as the Kelly-Howard rotor unit. The tools are withdrawn into the bar so



that it can be inserted in the fixture without interference. The diamonds are then brought out to the cutting position. The construction of the tool is such that the maximum tolerance does not exceed 0.0002 in. In this position the bar is in static balance.

The bars are made of heat-treated alloy steel, and all of the parts of the bar are self-contained. A new type of an inserted strip pilot is also featured.

— 308 —

Counterbore and Spot Facer

Scully-Jones & Co., 1901-1913 *South Rockwell St., Chicago, Ill.* [Vol.67,p.1038]

As in other tools made by this company, this counterbore features the principle of "drive by the square and center by the shank." The square driving portion of the cutter is located immediately behind the cutting edge, and the shank extends beyond this portion into the body of the taper driver shank. Standard Morse tapers are regularly supplied, but any special shank can be had on request.

The counterbores range in size from ¾ to 3 in. in diam., and the end pilots ¾ to 1¾ in. The

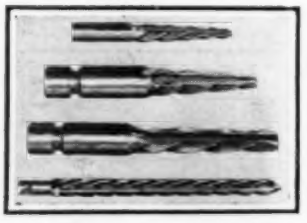
pilots are hardened and ground on the diameter, but the stems are left soft to reduce breakage. Centers are provided at both ends, so that the pilot can be ground to any special diameter. The driver is also hardened and ground.

— 309 —

Reamers, Taper, "Duplex"

Gammons-Holman Co., Manchester, Conn. [Vol.67,p.385]

The Gammons "Duplex" taper reamer is made to order (in all except the very small sizes) up to 3 in. in diam., and of any de-



sired taper. Standard Morse tapers and standard taper-pin reamers of this type are carried in stock, however.

The reamer has a single straight blade extending over its full length, while the remaining blades are disposed in an interrupted helix of left-hand lead. The helix angle increases toward the small end in accordance with the degree of taper, the lead remaining uniform. Because of its construction, the tool is said to be chatterless.

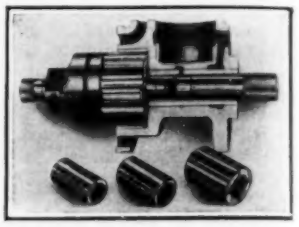
The reamers are made for machine or hand use, and unless otherwise specified, are made of high-speed steel. In the larger sizes for machine use, an oil hole extends through the center for flushing purposes.

— 310 —

Reamer Guide, Triple-Valve

Foster-Johnson Reamer Co., Elkhart, Ind. [Vol.67,p.559]

A sleeve and expanding adapter has been developed for piloting the triple-valve reamers, made by this company, central with the slide valve bushings. The sleeve is bored and internally ground at the top end for



receiving the pilot extending from the reamer body. The opposite end of the sleeve is threaded to receive the knurled hand nut and has a tapered seat beginning where the threaded portion end is ground.

Split adapters which have tapered holes to fit the tapered seat on the sleeve are provided for the various sizes of slide valve bushing holes. Four of these comprise the complete set for the types F-J AB-12 reamer.

—311 —

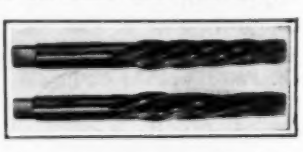
Reamer, Taper, "Rapid Cut"

Manchester Tool Co., Manchester, Conn. [Vol.67,p.995]

A helical-fluted taper reamer in which the helix angle of the cutting edges varies as between flutes has been brought out. This peculiar disposition of the flutes has the apparent effect of producing a reamer with a greater number of flutes at the ends than at a point midway between them.

The claim is made that the different helix angles at which the several blades are disposed effectually forestalls tendency to chatter. The reamer may be resharpened on centers of any ordinary tool-room equipment.

These reamers are made in pairs, each pair including a finishing reamer of the type mentioned, and a roughing reamer of the same size with uniform



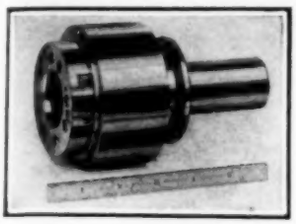
helix angle and with blades nicked at intervals to break up the chips. They are furnished in all standard sizes of Brown & Sharpe, Morse or Jarne taper with square, round or tapered shanks.

— 312 —

Diehead, Style EE, H & G

Eastern Machine Screw Corporation, New Haven, Conn. [Vol.67,p.210]

The Style EE diehead is for use on rotating die spindles and is both opened and closed by means of one yoke. It has a smaller outside diameter, improved locking and tripping mechanisms, and is also lighter



in weight than the previous models put out by this company.

The chasers are supported directly over the chamfer as in other H & G dieheads and the same chasers may be used.

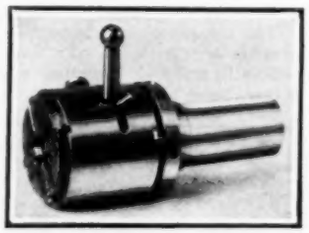
The Style EE head is available in four sizes: ⅞, 1, 1, and 1¼ inch.

— 313 —

Diehead, Style KH

Geometric Tool Co., New Haven, Conn. [Vol.67,p.394]

This stationary self-opening diehead, known as the Style KH, is for use in hand screw machines and turret lathes. The diehead is opened and closed



axially, the opening action being accelerated by springs. The locking mechanism consists of a pawl having a broad surface of contact.

The chasers are backed up directly behind the cutting point by a closing sleeve and are rigidly supported on both sides and the bottom by a supplementary support adjacent to the front plates.

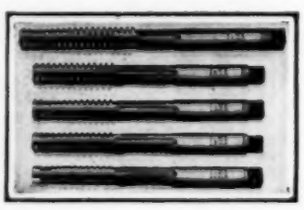
The diehead is made of a special alloy steel and is hardened and ground throughout. It is built in five sizes, having a cutting range for straight threads from ⅛ to 3½ in. and for pipe threads from ⅛ to 3 inch.

— 314 —

Taps, Ground, Acme- and Square-Thread

John Bath & Co., Inc., Worcester, Mass. [Vol.67,p.387]

The illustration shows a progressive set of ground taps to cut Acme threads. The teeth



of the first tap are of rectangular shape and alternate teeth are made with small recessed notches and projections at their outer ends. The teeth grow longer, but not wider, toward the shank of the tap.

The second tap continues the work of the first one. The teeth of the third tap begin to assume the angular shape of the Acme thread form toward their crests, but the material comes out in the form of several narrow, curled shavings, instead of one wide chip. The teeth of the fourth tap are again rectangular in shape toward the crest but merge into the Acme form at the root. The fifth tap is of full and true Acme form.

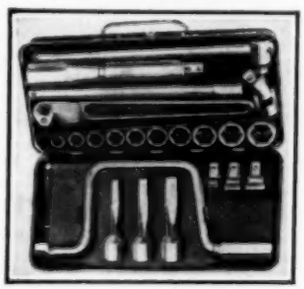
The square-thread taps are similarly designed. Both the square- and Acme-thread taps can be furnished in any commercial size and pitch down to ⅜ in. in diameter.

— 315 —

Wrench Set Utility, No. 190

Husky Wrench Co., Milwaukee, Wis. [Vol.67,p.254]

This set comprises a complete range of socket wrenches, plus three socket screw drivers, three



sizes of screw driver bits and a special screw driver handle with swivel grip.

The set is packed in a compact black enameled box.

All units are heat-treated and nickelplated. The set is intended for automotive and industrial maintenance repair work.

— 316 —

"Obstruction Superrench"

J. H. Williams Co., Buffalo, N. Y. [Vol.67,p.519]

For particular use in manipulating awkwardly-placed bolts and nuts the "Obstruction Supperrench" was designed with narrow pointed jaws and thin heads with a 75-deg. angle of opening.

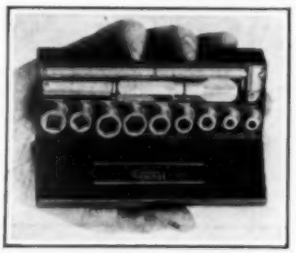
The jaws of both heads project from the same side of the handle and thus offer a comfortable grip. Also, because of this construction, the jaw that receives the strain near its point is reinforced by the handle. The wrench is forged from chrome-molybdenum steel and is guaranteed against breakage. It is furnished in a wide variety of sizes for both U. S. and S. A. E. standard nuts and capscrews.

— 317 —

Socket Wrench Set, "Baby," No. 999

Husky Wrench Co., Milwaukee, Wis. [Vol.67,p.879]

This set of socket wrenches is for little bolts and nuts such as are found on carburetors, magnetos and radio and electrical parts. The set has all the features found in the larger Husky



wrenches such as hardened and tapered sockets, long handles and swivel grips.

The sockets are made to fit the new American Standard bolt and nut sizes. The two small square sockets can also be used for holding small taps having square shanks. The socket sizes are 5/32, 3/16, ¼, 5/16, 11/32, ⅜, 7/16 in., hexagon, and ¼ and 5/16 in., square. All sockets are stamped with the size of the opening across the flats.

The combination T has a self-locking head and a handle 5 in. long with a center groove. The screwdriver is 4½ in. long and has a swivel grip to facilitate speedy operation.

— 318 —

Chuck, Quick-Change, "Wiard"

J. C. Glenzer Co., 6463 Epworth Blvd., Detroit, Mich. [Vol.67,p.525]

The "Wiard" quick-change chuck, formerly manufactured by the American Standard Tool Works, Detroit, Mich., has been added to the line of tools put out by the above company. The patents, jigs, fixtures, gages and machinery have been acquired by the company.

— 319 —

Fuse Puller and Screw Driver, "Midget"

Trico Fuse Manufacturing Co., Milwaukee, Wis. [Vol.67, p.958]

The combination "Midget" fuse puller and screw driver is made of horn fiber and is 5 in.

in length. One end has gripping jaws for handling small cartridge fuses ¼ to ½ in. in diam. The other end has a screw driver for use on small screws as found on electric sockets, plugs and the like. The only metal part is the screw driver which extends ⅞ in. beyond the fiber handle.

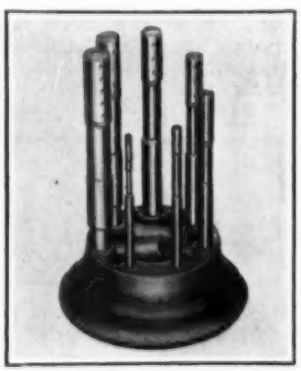
— 320 —

Laps, "Copper-Head"

Groetchen Tool and Manufacturing Co., 721 Fulton St., Chicago, Ill. [Vol.67,p.678]

Seven sizes of "Copper-Head" laps ranging from ⅛ to ½ in. in diam. are available. The lap consists of a permanent steel body and a replaceable copper sleeve. In the set are included seven extra sleeves, a stand, and a quantity of Alundum abrasive grain.

The sleeve is formed from flat stock and is held on the



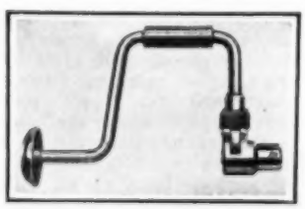
body by a tongue. Grooves machined radially on the body and holes drilled through the sleeve serve to distribute the abrasive. The lap cuts freely and renders a clean, true hole.

— 321 —

Ratchet Brace, Heavy-Duty

Whitney Metal Tool Co., Rockford, Ill. [Vol.67,p.490]

What is said to be a light, rigid ratchet brace for heavy-duty service was recently placed on the market. The frame is made of seamless tubing in or-



der to reduce the weight. The ratchet dogs and ratchet heads are made of hardened alloy steel, and the ratchet head housing is welded to the tubing. The breast plate and handle grip are ball-bearing mounted.

— 322 —

Small Tools

American Swiss File & Tool Co., Elizabeth, N. J. [Vol.67, p.250]

This company recently took over and is now manufacturing the complete line of small tools formerly made by the Braunsdorf-Mueller Co., of Elizabeth.

This line includes knurl sets and holders, plumb bobs, cold chisels of all kinds, stone drills, socket wrenches, bearing scrapers, and several styles of punches, besides a miscellaneous lot of small tools.

—323 —

Square, Combination, No. 600-B, Bates

Union Tool Co., Orange, Mass. [Vol.67,p.602]

The chief feature of the Bates No. 600-B improved combination square is the die-cast head, which is said to have a tensile strength of 40,000 lb. per sq.in. The head is claimed

to be lighter in weight, rust proof, and easier to handle than the older model. It is finished in black enamel and is fitted with a scriber and level. It comes mounted on a 12-in. steel rule.

— 324 —

Stamping Die, Combination

A. J. Sossner, 361 W. Broadway, New York, N. Y. [Vol.67, p.563]

A steel die of improved form has been developed to stamp out in one stroke intricate designs in sheet metal such as a trade mark. The die is constructed of high-quality high-carbon steel, carefully hardened so as to be free from warpage. It is made slightly convex to produce a slight shearing action.

The principal feature of the die is the large number of stripper pins used to eject both the complete stamping from the sheet and the small pieces punched from within the letters, in the example illustrated. The stripper pins are held in a plate of intricate form placed within the die itself. This plate is

backed up with powerful helical springs. Both the upper and lower die contain such stripper plates.

The principle of design can be applied to a variety of sizes and shapes.

— 325 —

Sub-Presses, Steel, Standard

U. S. Tool Co., Inc., Ampere, N. J. [Vol.67,p.558]

Twenty-three sizes and three styles of standard steel sub-presses are now available and other sizes are being made to suit the demand. The use of machine steel is said to result in greater die space, because the

plates are thinner for the same strength, and in the maintenance of alignment since the base will not distort after machining. A bolster plate with large holes may be used because of the strength of the sub-press.

Style SO is the open-plate type and has two leader pins at the rear; style SM has the leader pins centrally located on the sides, while Style S has the pins centrally located front and rear. The bushings for the leader pins are hardened and ground.

The die space varies from 4x4 in. to 8x11 in. Special sizes may be had on order.

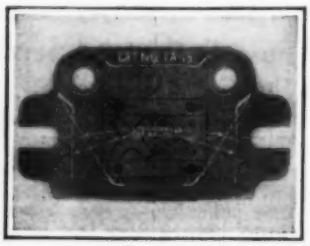
— 326 —

Templets, Die-Set, Transparant

Danly Machine Specialties, Inc., 2104 S. 52nd Ave., Chicago, Ill. [Vol.67,p.37]

This series of transparent die set templets is for use in determining the size and type of die-set required for the particular die layout on the drawing board.

The templet consists of a tough, transparent material through which the details of the



die drawing can be seen. There are thirty different templets in the complete outfit, covering 14 types and 113 sizes of Danly die sets. The templets corresponding to the direct size of die set is selected by trial.

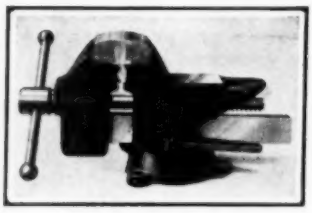
A rubber stamp is furnished by which a tracing or blueprint can be stamped to indicate the set required.

— 327 —

Vise, Utility, No. 3½

Simplex Tool Co., Woonsocket, R. I. [Vol.67,p.252]

The No. 3½ utility swivel vise combines a pipe vise and an anvil. The jaws are 3¾ in. wide, and have hardened steel inserts.



The anvil is provided with a horn for use with round pieces or rings and hoops.

The removable jaw is actuated by a steel square-thread screw. The slide is made of steel and is accurately fitted to eliminate wobble.

The maximum opening of the jaws is 4½ in., and the weight of the unit is 18 lb. net.

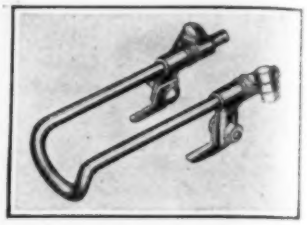
— 328 —

Vise Work Support

A. F. K. Fountain Works, Milwaukee, Wis. [Vol.67, p.1040]

The vise work support is intended to materially increase the holding power of a vise, especially on work of an eccentric shape or on stock with very little gripping surface. It is quickly attached to the vise and can be readily removed.

The supporting yoke is made of nickel steel, case-hardened to prevent distortion. Two adjustable malleable-iron clamps hold the yoke to the vise jaws



and two helical torsion springs allow the jaws to be moved in and out to accommodate stock from ¾ to 2 in. in diam., without disturbing the setting of the support. The clamps can be adjusted for attachment to jaws from 3x1 in. to 7x2 in.

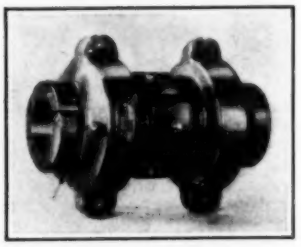
— 329 —

Ball Bearings, Split

Split Ball Bearing Corporation, Lebanon, N. H. [Vol.67, p.752]

This line of split ball bearings is intended for lineshafts and other applications where the placing or repair of a single-piece bearing would involve taking down shafts and removal of pulleys or couplings.

The components of a complete bearing are: a sleeve split longitudinally and held together with screws and dowels; a bearing



shell also split longitudinally and held together by similar means; balls, and spacers.

The ball races, four or eight, according to whether it is a single or a double-row bearing, are made in halves, formed, hardened and forced into corresponding grooves in the sleeve and shell, and swaged into place. They are then form-ground. The bearings are made for all commercial sizes of shafting up to 2⅞ in. and are for use with any standard hanger.

Transmission Equipment

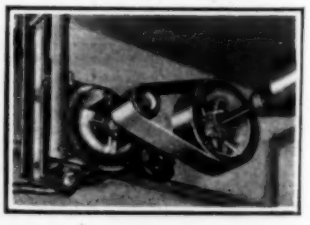
— 330 —

Belt Drive, "Uni-Pull"

Rockwood Manufacturing Co., Indianapolis, Ind. [Vol.67, p.561]

A marked improvement in operating efficiency over fixed-center belt drives on short centers is claimed.

The drive consists of a Rockwood pulley and a motor so mounted that gravity maintains the belt under a predetermined tension to meet the power requirements of the installation. The motor is mounted on the



side of the frame which is suspended freely from the ceiling. The offset weight of the motor tends to produce rotation, which is resisted by the pull of the belt.

The use of excessively tight belts on short-center drives has been obviated.

— 331 —

Leather Belts, Waterproof

J. E. Rhoads & Sons, 35 N. Sixth St., Philadelphia, Pa. [Vol.67,p.679]

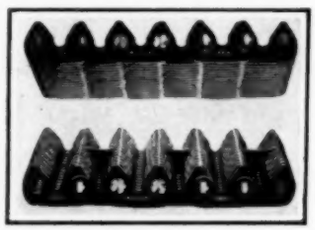
All regular brands of belting made by this company are now being supplied with waterproof cement and with a special treatment to render the belts water-resisting. In this way the belts can be used on either dry or wet conditions. Besides the waterproofing qualities, the treatment is said to increase the gripping properties.

— 332 —

Chain, Silent, Improved

Morse Chain Co., Ithaca, N. Y. [Vol.67,p.396]

In the improved design of rocker-joint chain, known as type 55, the links are the same length and height as the old ones so that the chain will run on all standard sprockets. The joints operate on the same principle as the original Morse rocker joint, but the seat pin has been enlarged to give greater bearing surface and the



rocker pin has been changed in contour.

The combined joint members give a more nearly round hole with reduced clearance, thus holding the link more accurately on the pins, and resulting in a smoother running chain. The breaking strength has been increased about 50 per cent.

— 333 —

Conveyor Chain, Drop-Forged, "Morco"

Moore Drop Forging Co., Springfield, Mass. [Vol.67, p.832]

"Morco" drop-forged conveyor chain is being made in both open-link and closed-link types for general use on drag lines, bucket or floor conveyors, or monorail installations. Either malleable or drop-forged attachments such as scrapers, pushers, trolley extensions, and the like, can be furnished. The malleable attachments are secured to the center of the links by means of bolts, while drop-forged attachments are forged integral with the side links.

The chain is of patented construction and has a center link and a side link. It can be easily taken apart or assembled without the use of tools. The chain is designed to fit nearly all standard sprockets. It is made of special high-carbon steel and is said to be resistant to corrosion.

It is claimed that the links cannot buckle or come apart in service, and that it has great tensile strength per unit weight.

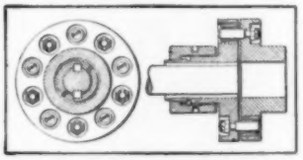
— 334 —

Flexible Coupling, Tension-Sleeve

Ajax Flexible Coupling Co., Westfield, N. Y. [Vol.67,p.682]

This tension-sleeve flexible coupling was designed for particular use where quick changes of hook-up are necessary, or where it is desired to have one motor drive different machines at different times.

The coupling is a modification of the standard Ajax rubber-bumper coupling, in that the



flange attached to the driven shaft is readily removable. The removable half is made with an extended split hub on the driving flange, and a screw collar holds the flange in place.

This type of coupling can be connected or disconnected in a few minutes, the only tools required being a pipe wrench and a set-screw wrench. The removable flange and collar are made of steel. All other parts are interchangeable with standard Ajax couplings.

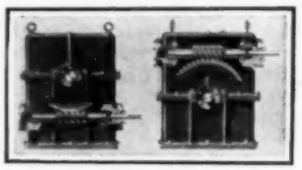
— 335 —

Worm Gear Speed Reducer, Heavy-Duty

D. O. James Manufacturing Co., 1114 W. Monroe St., Chicago, Ill. [Vol.67,p.490]

The unit has been particularly designed to meet severe conditions, and in order to assure smooth action the worm and gears are run in on a special relieving machine.

The housings are made of cast iron and are designed for maximum cooling space. They



are braced on the outside for strength. When the worm is at the top of the unit, sight feed oil cups are used, while an oil level cock prevents over-oiling.

All parts are made with an ample factor of safety. Gears are made of phosphor bronze and the worms of chrome-nickel steel. Timken and Norma Hoffman roller bearings with interchangeable bushings are used to carry the worm and the wheel.

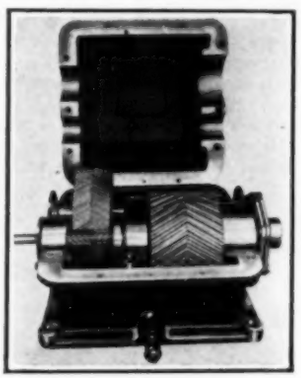
— 336 —

Gear Reducer, Herringbone, Sykes

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. [Vol.67, p.520]

The Sykes herringbone gear reducer is being made in three standard units designed to cover a wide range of ratios and capacities. Type S, a single reduction unit, covers ratios up to 10 to 1. Type D, a double reduction unit, is designed for heavy duty in ratios from 10 to 1 up to 80 to 1. Type DV is a light-duty, double-reduction unit with ratios ranging from 10 to 1 up to 130 to 1.

The herringbone gears are made of high-carbon steel with continuous teeth across the face.



The pinions are made of heat-treated alloy steel with the teeth cut integral with the shaft.

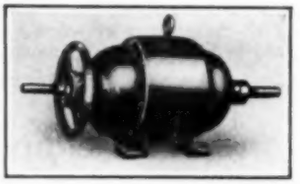
Oversize ball bearings are used throughout.

— 337 —

Transmission, Variable-Speed, Type JFS

Stephens-Adamson Manufacturing Co., Aurora, Ill. [Vol. 67,p.559]

In the type JFS variable-speed transmission, speed changes can be made while the unit is in operation simply by turning the control wheel shown at the left of the unit in the illustration. A speed range of 5 to 1 is available. The mechanism is entirely incased within a housing that excludes foreign matter and confines the lubricant.



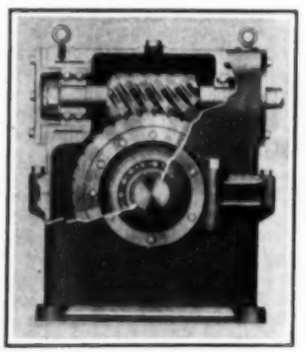
The efficiency of this transmission is said to be over 95 per cent at capacity loading. The machines are built in sizes from ½ to 15 hp. rating.

— 338 —

Worm Gearing, "IXL Moderntype"

Foote Bros. Gear & Machine Co., 215 N. Curtis St., Chicago, Ill. [Vol.67,p.678]

As in the previous "Hygrade" type, all "Moderntype" worms are cut integral with the shaft from alloy steel forgings, carbonized, ground, and polished.



The worm gears are made of chilled, cast bronze, the teeth being cut with special hobs and generating machines. In sizes larger than 6½ in. center distance, the worm gear is mounted on a cast-iron center. Steel centers can also be supplied.

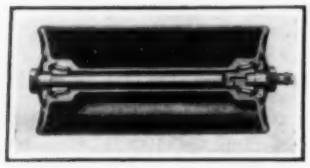
Both the worm and worm-wheel are carried on anti-friction bearings. The worm has a special form of tooth which is said to greatly reduce the frictional losses and heating effects, and to insure high efficiency and long life under continuous operating conditions.

— 339 —

Idler, Belt Conveyor, Anti-Friction

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. [Vol.67, p.173]

This belt conveyor idler incorporates Timken tapered roller bearings fully inclosed.



One of the outstanding features is the protection afforded by a labyrinth grease seal, mounted in a grease cap, which also serves as an outboard reservoir.

All three rolls are interchangeable and can serve in any position. The idler rolls are supported in malleable-iron brackets so constructed as to support the ends of two adjacent rolls. These idler rolls are made of various standard lengths and are furnished to suit standard belt widths.

Welding Equipment

— 340 —

Welding Outfit, Atomic-Hydrogen

General Electric Co., Schenectady, N. Y. [Vol.67,p.292]

By the use of the atomic-hydrogen welding equipment, it is said that hitherto unweldable metals can be fused without trace of oxidation, and welding can be performed in some cases on metals as thin as paper. This process makes possible the production of ductile welds.

In brief, the method utilizes the passage of a stream of hydrogen gas through an arc between two electrodes. As they pass through this arc the hydrogen molecules are broken up into atoms which recombine a short distance beyond the arc and in doing so liberate a large quantity of heat. The atomic hydrogen formed is a powerful reducing agent, so that alloys containing chromium, aluminum, silicon or manganese can be welded without fluxes and without surface oxidation.

The welding outfit consists of a welding torch, a single-phase transformer for converting the voltage of the 60 cycle source of power to one suitable

for the welding equipment and a specially-designed, variable reactor.

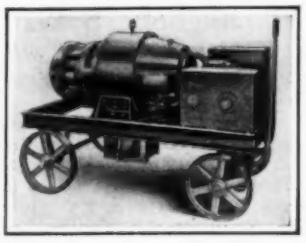
The torch consists of a holder supporting two tungsten wire electrodes set at an angle. Each electrode is supported inside a nozzle through which hydrogen gas is forced out around the electrode.

— 341 —

Arc Welder, Single-Operator

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.67,p.488]

Simplicity of operation is claimed to be the feature of the single-operator arc welder. The motor of the set is controlled by a magnetic "Linestarter," consisting of three magnetic contactors operated by a push-button switch. The welding current is controlled by a single resistor in the d.c. generator



field. The welder is built in three ratings: 200, 300 and 400 amperes.

The squirrel-cage motor used to drive the machine is wound for 220 and 440 volts. The sets are built either as stationary or portable units.

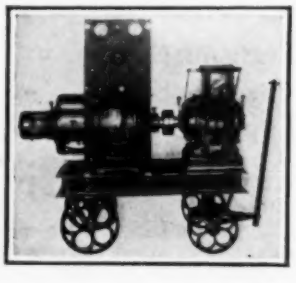
Due to the constant current characteristics of the generator, the arc is stable over a wide range. The constant-current characteristic assures deep penetration of the arc and complete fushion of the material being welded. The generator is also designed for quick voltage response to wide variations in the length of arc.

— 342 —

Electric Welder, "Fuzon"

Fusion Welding Corporation, 103d St. and Torrence Ave., Chicago, Ill. [Vol.67,p.523]

The "Fuzon" direct electric welder may be had in either portable or stationary types, motor or gas-driven, or by belt from a lineshaft. Certain types embodying two generators and



one motor permit one or two operators to work from the same set. The available current may range from 100 to 800 amperes.

In all the various types the same general principles are applied. The stabilizing is accomplished entirely by the generator winding, a feature covered by the Hansén Patent.

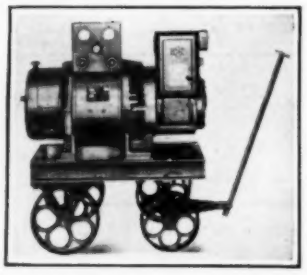
All Fuzon welders are compact, yet all parts are ruggedly proportioned. Ball bearings are used throughout. The voltage regulation is completely automatic and covers a wide range for both carbon-arc and metallic rod welding.

— 343 —

Arc Welder, Motor-Driven, No. 300, "Fuzon"

Fusion Welding Corporation, 103d St. and Torrence Ave., Chicago, Ill. [Vol.67,p.791]

The No. 300 d.c. machine is operated by a three-phase a.c. motor either on 220 or 440 volts. Both the welding motor and generator are mounted on the same shaft, making a two-bearing unit. The chief characteristic claimed for it is its flexible arc. The machine is said to respond instantly to changes in arc length.



The welding current is controlled by simple brush-shifting device, giving a wide range of operation. The current can be varied from 50 to 300 amp. and over this range the arc is equally flexible and stable. This is due to the fact that by shifting the brushes not only the current going to the operator is controlled, but also the volt-ampere characteristic of the machine is suitably altered.

Metals from the thinnest to the thickest can be welded with equal facility.

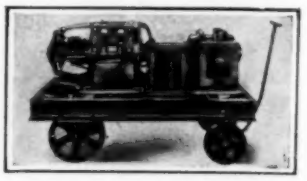
— 344 —

Welder, Single-Operator Type

General Electric Co., Schenectady, N. Y. [Vol.67,p.1039]

This single-operator welder includes a four-bearing, ball-bearing, motor-generator set with a flexible coupling between. For this equipment the manufacturers claim a rapid and simple interchange of motors may be made by the user. As a result, inspection, maintenance, renewals and changes in the supply circuit are simplified.

The generator is rated at 300 amp., one hour, 50 deg. C., and the driving motor at 15 hp. 40



deg. C., continuous rating. The generator is so designed that field control is unnecessary. The generator panel includes an ammeter and a voltmeter but not the customary rheostat. The meters used have a metal front except for the glass over the scale, thus minimizing the possibility of breakage.

The starters for the a.c. motors are of the closed magnetic type. The d.c. motors use a simple resistance starter with a line switch.

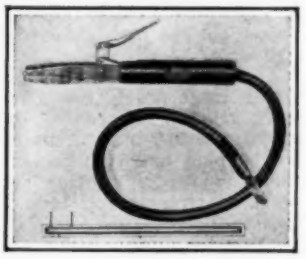
The generator is designed to permit either belt, motor or engine drive and is either for stationary or portable use. The designation WD-300-A has been given it by the manufacturers.

— 345 —

Electrode Holder, "Fuzon"

Fusion Welding Corporation, 103d St. and Torrence Ave., Chicago, Ill. [Vol.67,p.557]

The "Fuzon" electrode holder is for metallic arc-welding electrodes of all classes, particularly surfaced electrodes. The device is said to minimize overheating of the electrodes, and to give perfect contact under all conditions. When the electrode is placed in the holder, the jaws clamp and also push forward



the electrode. This movement scrapes all surface material from the four points of contact, thus assuring the welder of positive electrical contact and in this way eliminating overheating.

The electrode stub ends are readily removed. Spattered weld metal will not stick to the jaw holder. Included with each holder is 3 ft. of extra-flexible cable and a connecting lug.

Weight, 2 pounds.

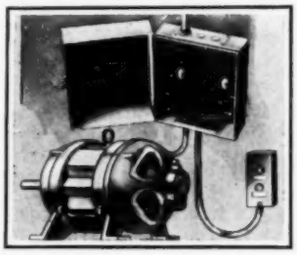
Electrical Equipment

— 346 —

"Linestart" Motor with "Linestarter"

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.67,p.518.]

A "Linestart" motor operated by a push-button "Linestarter" has been recently developed. The low-current characteristics of the Linestart motor allows starting directly from the line. This motor is provided either with a starting torque that compares with the standard squirrel-cage motor, or with two to two



and one-half times full-load torque. A manual starter may be used with this motor, but the Linestarter is said to be simpler and safer in operation.

The starter consists of a simple three-pole magnetic contactor and thermal overload relay mounted in a cabinet and operated through a push button or master switch.

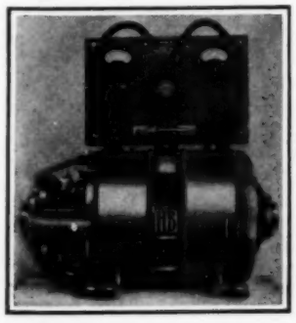
Sealed sleeve bearings, double impregnated windings, forged steel feet, positive ventilation, rigid brackets and other features of the standard squirrel-cage line are retained in this new line.

— 347 —

Battery Charger, Constant-Potential, 8-Hour

Hobart Bros. Co., Troy, Ohio. [Vol.67,p.680]

Four models have been added to the line of constant potential 8-hour battery chargers made



by this company. They are rated at 150, 250, and 300 amperes. Each unit consists of a motor-generator set of unit-type construction. Ball bearings are featured and all models embody a non-reversing, voltage-regulator winding.

The units will handle 20, 25, 30, and 35 batteries daily, respectively, and all except the last one are rated at 7½ volts. The 300-amp. outfits are furnished in either 7½ or 15 volts.

Regulator equipment includes a switchboard, connecting cables, leads, clips, and connectors. The motor can be furnished for use on any commercial circuit.

— 348 —

Motors, Totally-inclosed, for Portable Hoists

General Electric Co., Schenectady, N. Y. [Vol.67,p.677]

A line of motors was recently developed for use with portable electric hoists. The motors are also suitable for other applications involving intermittent operation and high starting torque. The line includes motors from 1 to 10 hp. in the d.c. types; from 1 to 11 hp. single speed, 2 and 3 phase, and 1 to 5 hp. single phase, in the a.c. types.

Two- and three-phase slip-ring type hoist motors are also included in ratings from 3 hp. up.

The d.c. motors are series wound, while the a.c. motors of the polyphase type have high-resistance rotors. The single-phase motors are said to have an unusually high starting torque.

The motors are all built with a shaft extended with a brake, and the motor end-shield is fitted with pads for mounting the brake.

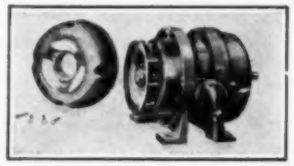
— 349 —

Motors, Induction, Fully-Inclosed, Fan-Cooled

Reliance Electric & Engineering Co., Ivanhoe Road, Cleveland, Ohio. [Vol.67,p.718]

This line of fully-inclosed fan-cooled induction motors with ball bearings is for use on two- or three-phase a.c. circuits.

Internal fans are used to circulate the air around the coil heads causing the heat to be transmitted to radiating bonnets that entirely surround them. Across the outside surfaces of these bonnets a strong blast of air is also blown that absorbs the heat from the bonnets and



carries it into the surrounding atmosphere. This blast of cooling air also passes across the outside of the stator core. It is produced by large radial fans at each end of the motor shaft.

The motors are made in sizes from 1½ to 10 hp. with speeds of 900, 1,200 and 1,800 r.p.m. They are used on 220-, 440- and 550-volt circuits, 60-cycle, two- or three-phase, and are rated at 55 deg. C for continuous duty.

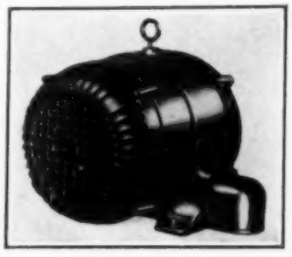
— 350 —

Motors, Inclosed, Self-Ventilated

Fairbanks, Morse & Co., Chicago, Ill. [Vol.67,p.720]

A line of inclosed self-ventilated motors was recently developed in the same frame diameters as standard motors of corresponding horsepower. This type of motor has a standard stator core and windings, and a standard rotor mounted on self-aligning ball bearings. Winding shields are provided so that the stator windings are totally inclosed.

Cooling air is drawn through an inlet by means of a special type of fan that also functions as an air cleaner. The clean air



is blown across the winding shield through an annular air space, then across the outer end of the stator core laminations, thence across the winding shield at the pulley end and out through openings in the bearing arms. The motor is impervious to dust and dirt.

Provision is made for lubricating the ball bearings without removing the guard, fan or bearing arms, by the use of a plunger device located in an extended grease tube.

— 351 —

Motor, Squirrel-Cage, Double-Winding, Variable-Leakage

Fairbanks, Morse & Co., Chicago, Ill. [Vol.67,p.756]

The variable-leakage, double squirrel-cage motor features low starting current with good running characteristics. The illustration shows a section through the rotor slot.

The current in the inner winding at start is choked by means of movable iron rods placed in each rotor slot between the inner and outer squirrel-cage bars. The instant the motor is connected to the line, the iron rods are pulled down towards the inner bars, thus forming a complete iron circuit for magnetic flux around each inner

bar. The resulting choking action on the inner winding forces almost all of the current to flow in the outer high-resistance winding and in this way produces a high starting torque with low starting current.

As the rotor accelerates the iron rods are thrown out of the leakage gaps by centrifugal force. Hence the choking effect is removed from the inner winding when the motor is running.

— 352 —

Frequency Changer, Improved

Forbes & Myers, 172 Union St., Worcester, Mass. [Vol.67, p.874]

This simplified frequency changer is available in sizes from ⅛ to 3 kva. The unit will convert 2- or 3-phase, 60-cycle current, of any voltage into 1-, 2-, or 3-phase current of 180 cycles at any voltage.

The construction of the frequency changer is similar to that of the ordinary induction motor. The stator has two

windings, a double-pole winding connected to the 60-cycle circuit, and a six-pole winding which delivers the 180-cycle current.

The rotor differs from that of the ordinary induction motor, however, in that two opposite sections are cut away, leaving but two-thirds of the usual rotor core. Bars and rings are used to carry the current.

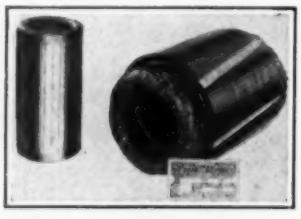
The unit is particularly recommended for use in operating high-frequency tools such as small grinders and drills.

— 353 —

Electric Motor, Shell Type

Lincoln Electric Co., Cleveland, Ohio. [Vol.67,p.873]

This squirrel-cage motor is for use in various kinds of woodworking machinery and all



other machinery requiring high-speed motors. The motor is of the so-called shell type, of all-welded design, and is made to standard dimensions. It is supplied in 3- and 5-hp. sizes.

The 3-hp. unit has an external diameter of 6½ in. and an external length of 4½ in. The 5-hp. motor is of the same diameter and is 6 in. in length. Both motors are manufactured for either 2- or 3-phase, 60-cycle current and have a rated speed of 3,600 r.p.m. The stator is composed of laminated sections arc-welded together.

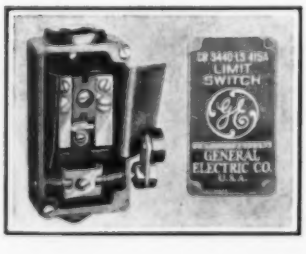
The rotor is also entirely arc-welded and is provided with either a straight or tapered bore. If desired, the stator can be supplied with 6 ft. leads.

— 354 —

Limit Switch, Small

General Electric Co., Schenectady, N. Y. [Vol.67,p.173]

The small limit switch was designed for use in control circuits. It can be used for stopping carriages at the end of the



travel and for similar applications.

The switch is made of cast iron, and is arranged for conduit connection. It is dust tight. The contacts may be either normally open or normally closed, and the operating arm can be set at any angle. The operating arm can be placed on either side of the switch.

A varnished cambric lining completely incloses the contacts, thus eliminating any possibility of short circuits. When the switch is opened about ¾ in., it has a capacity of 2 amp. at 125 volts, 1 amp. at 250 volts, and 0.4 amp. at 600 volts.

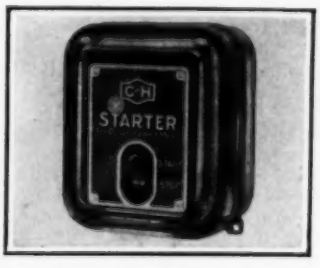
— 355 —

Starter, Across-the-Line, Type "AAA"

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 67,p.209]

This type "AAA" across-the-line started designated as C-H 9586 was designed to control motors of 5 hp. and under. Push-button control is used for starting and stopping. The unit incorporates thermal-overload protection and no-voltage protection.

It does not take up much more room than a push-button station. The starter can be furnished to machinery builders



without the case for incorporation in the machine as standard equipment.

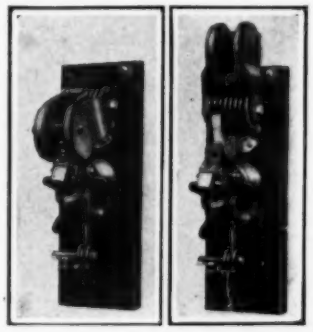
A roller is forced between two fingers to complete the circuit. Thus a double break and a wiping contact are secured. This arrangement is said to reduce arcing to a minimum.

— 356 —

Contractor, Mill-Type, D. C., Improved

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 67,p.250]

This company has equipped their d.c. mill contactors with an improved design of magnetic blow out. The design was perfected after considerable research as to materials and forms. The improved design is said to reduce maintenance and inspec-



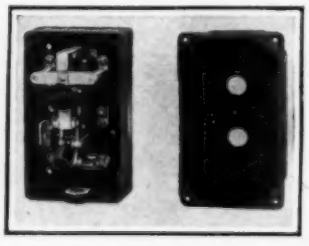
tion costs, since the contacts and blowout shields will not need to be renewed as frequently as before.

— 357 —

Push-Button Station, Time-Delay

General Electric Co., Schenectady, N. Y. [Vol.67,p.489]

In order to prevent the cutting out of motors controlled by a magnetic starter when there is only a brief power disturbance, the time-delay push-button station was developed. It is for use with standard magnetic starters. When power fails the magnetic starter will drop out, but will be caused to re-close upon the return of the voltage by the push-button device unless the time for which the push-button station is set is



exceeded. The device can be adjusted to a maximum of 1½ seconds.

If the power does not return before the time expires, then the starter will be disconnected until the "start" push-button is again depressed.

— 358 —

Starters, Push-Button

Allen-Bradley Co., Milwaukee, Wis. [Vol.67,p.554]

The complete line of a.c. and d.c. push-button starters, ranging from ¾ to 10 hp., 220 volts d.c. and up to 15 hp., 550 volts a.c., was designed to give complete protection to operator, motor and machinery.

The a.c. and d.c. switches of similar rating have the same external dimensions. Both types of switches are made in three forms. Form 1 has a "start" and "stop" push button mounted in the cover. Form 2 is designed for operation with outside push button, while Form 3 has a lever on its cover giving both manual and automatic control.

The a.c. starter gives protection against overload, no-volt-

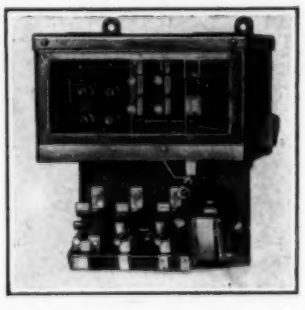
age and single-phase operation. The d.c. starter gives positive starting, no-voltage and overload protection. A special graphite resistor is used.

— 359 —

"Linestarters," Dust-Tight and Oil-Immersed

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.67,p.796]

Two modifications of the standard equipment of "Linestarters" are available. One of these has special provision for excluding dust, all possible openings being rendered dust tight. Another modification has all parts in which sparks or arcing might occur immersed in oil. The main current-carrying and breaking contacts are oil immersed, and the operating coil is



below the surface, as is the interlock. Consequently, under normal operating conditions, no explosive gases in or around the starter can be ignited by the operation of it.

— 360 —

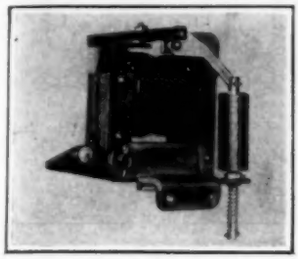
Time-Delay Device

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. [Vol.67,p.834]

For those applications that are liable to voltage drops of short duration, the time-delay attachment has been designed

for use on standard low-voltage release equipment.

The device is provided with an adjustment that allows the low-voltage release to open only when from ½ to 2½ sec. have elapsed after the voltage drops below the minimum value. If the voltage remains low



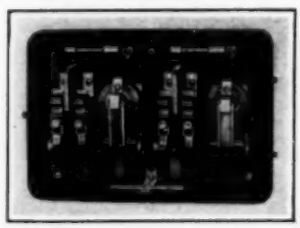
longer than the time for which the tabulation device is set, the motor circuit will be opened and the equipment protected from excessive current.

— 361 —

Reversing Switches, Small

General Electric Co., Schenectady, N. Y. [Vol.67,p.832]

Three small switches for miscellaneous applications are available. The CR-7009 F-1 and F-2 switches each consist of two 15-amp. double-pole contactors electrically and mechanically interlocked and inclosed in a



drawn-shell case. They are for use with momentary-contact push-button stations. The F-1 form is without overload relays, while the F-2 form has Trumbull overload relays.

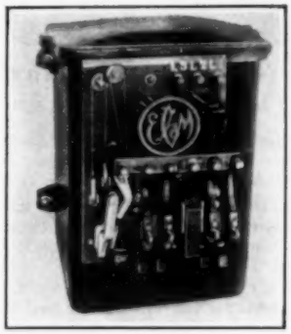
The CR-7009-B-10 switch differs only in capacity and consists of two 3-pole, 25-amp. contactors. The switch is recommended for applications wherever a small, magnetic reversing switch is required.

— 362 —

Starting Switches, Across-the-Line, Inclosed, Type ZO

Electric Controller & Manufacturing Co., Cleveland, Ohio. [Vol.67,p.995]

This company is now supplying its standard type ZO across the line starting switches for small a.c. motors, in iron-clad tanks, in order to make them



suitable for operation in atmospheres where acid fumes are present.

Like the standard EC&M type switches, all of the contacts, including the overload trip, open and close under oil, so that this starter is flameproof. There is a machined fit between the cast-iron cover and the tank, thus making the starter rain proof.

— 363 —

Watthour Meter, Single Phase, Type I-16

General Electric Co., Schenectady, N. Y. [Vol.67,p.36]

The outstanding feature of this type I-16 single-phase watthour meter is its long-range accuracy, said to be attained without sacrificing other essentials.

This accuracy is maintained under varying conditions of temperature, voltage, power factor or frequency.

Among the mechanical refinements of the meter are the method of attaching the cover, the sealing arrangements and the light load adjustment. The joint between the cover and the base has been made tamper-proof.

— 364 —

Solenoids, A. C. and D. C.

General Electric Co., Schenectady, N. Y. [Vol.67,p.208]

These solenoids are for use on all voltages and frequencies up to and including 550 volts.

Each size of solenoid has four types made up of the same frame. A pulling solenoid may be changed to a pushing one by adding two pusher bars. The pole face of the plunger is cylindrical and fits into a cylindrical seat on the frame.

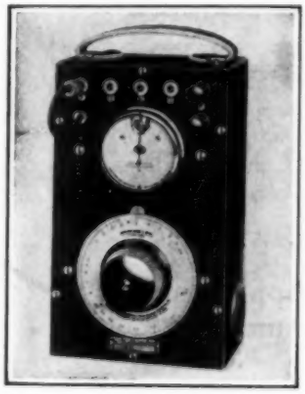
All coils are mounted on molded compound spools. Bakelite guides prevent the plunger from wearing the spool body.

— 365 —

Ohmmeter, Type COM

Roller-Smith Co., 233 Broadway, N. Y. [Vol.67,p.333]

The type COM ohmmeter is a form of slide-wire instrument designed for the rapid measurement of coils and resistance



units on a quantity production basis. The instrument is entirely self-contained in a case of black walnut.

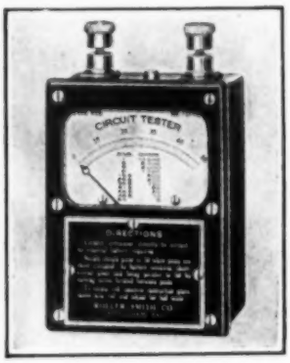
There are four ranges of 0.5 to 50, 5 to 500, 50 to 5,000, 500 to 50,000 ohms. The instrument operates on the principle that when the galvanometer needle balances at zero the value of the resistance under measurement can be read directly on the dial.

— 366 —

Circuit Tester, Type HTD

Roller-Smith Co., 233 Broadway, New York, N. Y. [Vol. 67,p.330]

The type HTD circuit tester can be used not only for circuit testing, but also for resistance measurements.



The instrument consists of a small high-grade d'Arvsonal type d.c. voltmeter connected in series with a small dry-cell. The scale is divided into 50 uniform divisions and directly below the scale is located a chart, by reference to which resistances up to 10,000 ohms may be calculated.

The instrument is inclosed in a heavy sheet metal case measuring 4½x3x1¼ in., and is equipped with nickel plated binding posts. It weighs 19 ounces.

— 367 —

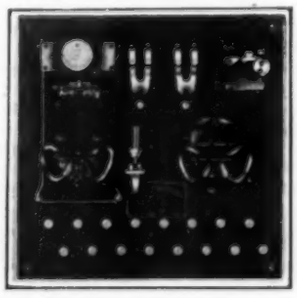
Power-Demand Limitator, "Edmoore"

Edward T. Moore, 500 Cahill Bldg., Syracuse, N. Y. [Vol. 67,p.601]

Peak loads on electric power systems can be automatically controlled and limited by the "Edmore" power-demand limitator. When the predetermined demand has been reached, the limitator will reduce the power supplied to one or more power-consuming units such as furnaces, ovens, or motors, and thus limit the peak. This load reduction is of brief duration and will not lower production or quality of product to any considerable extent.

The instrument is made in three styles. Model 1, known as the integrated control limitator, is used with electric steel furnaces, brass furnaces, or any load having automatically motor-operated electrodes.

Model 2 is for use with all types of motor load where the driven machine may be shut down without stopping the motor or where the motors may be



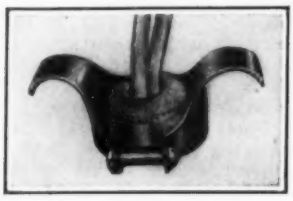
stopped without seriously interfering with processes of production. Model 3 is specially designed for use with all types of resistance loads such as annealing and heat-treating furnaces, and enameling, japanning and baking ovens.

— 368 —

"Pull-a-Plug"

Ren Manufacturing Co., Lyceum Bldg., Winchester, Mass. [Vol.67,p.957]

The "Pull-a-Plug" device is used for separating plug caps from the base without touching the wire, thereby eliminating frayed wires and other annoyances. It is readily slipped onto



plug-caps of any style or make and is quickly fastened by tightening a screw. The two curved arms form a convenient grip for the fingers.

Pull-a-Plug also serves as a shield and protects the plug cap from breakage. It is finished in black japan to match the hard-rubber or composition plug. The device is patented.

— 369 —

Unbreakable Plug

Cutler-Hammer Manufacturing Co., 611 Twelfth St., Milwaukee, Wis. [Vol.67,p.922]

This unbreakable attachment plug is made of a high grade of rubber and is light in weight. The terminals are fastened in a

Bakelite strip firmly embedded in the rubber base. Rivet and anchor construction is used to hold the terminals to the Bakelite to keep them from turning. Staked screws prevent loss and save time in wiring.

When the plug is used with rubber cord, it is easy to relieve the strain between the cord and the plug by cementing the cord covering into the rubber plug.

Lubrication Equipment

— 370 —

Oilers, Positive Pump

Plews Oiler Co., 405 Boston Block, Minneapolis, Minn. [Vol. 67,p.75]

This line of positive pump oilers is made in six styles and sizes ranging from ¾ pint to

1 qt. capacity. At the start, a pressure of 100 lb. per sq.in. is applied so that the pump will positively operate in warm or cold weather and with either light or heavy oil.

The cans are made of steel, copper plated. The pump action is controlled by a thumb lever mounted on top of the handle. The pump proper consists of two telescoping tubes with ball valves in the bottom of both the movable and the stationary ones. Upward movement of the outside sleeve forces oil into the upper chamber which is constantly filled with oil.

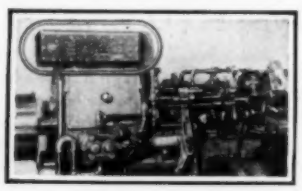
— 371 —

Applications of Automatic Oiler

Madison-Kipp Corporation, Madison, Wis. [Vol.67,p.489]

In the illustration is shown the application of an automatic oiler to the National Acme Model C automatic lathe. The lubricator has been made an integral part of the motor base, and does not use a separate tank. The lubricating mechanism is placed in the side of the machine, and is driven off a rotating spindle so that it operates automatically with the machine.

The lubricator has also been applied to a punch press in order to obviate hand oiling. The automatic lubricator is said to save a considerable percentage of the production time.



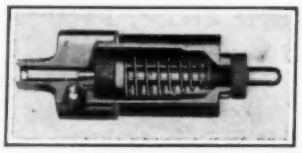
— 372 —

Grease Cup, Pressure, "Dot-O-Matic"

Dot Lubrication Division, Carr Fastener Co., 31 Ames St., Cambridge, Mass. [Vol.67,p.755]

The cup is applicable to any bearing upon which a light grease may be used as a lubricant. By adapting the consistency of the grease to the conditions the cup is claimed to render satisfactory service at low temperatures.

The cup contains a spring-actuated plunger working within the chamber that expels the grease. The stem of the plunger extends in both directions: The upper part is surrounded by an annular adjusting nut by which the pressure of the spring is regulated, while the part below the plunger is tapered with the smallest diameter toward the plunger. Thus, when the chamber is filled with grease and the spring is at its greatest degree of compression, the large



diameter of the stem nearly fills the outlet. As the spring pressure gradually decreases because of the descent of the plunger, the capacity of the orifice automatically increases.

Filling is accomplished by attaching a grease gun to the "Dot" nipple. The cup is now made in sizes of 1 and 2 oz. capacity, and a 4-oz. size is under construction.

— 373 —

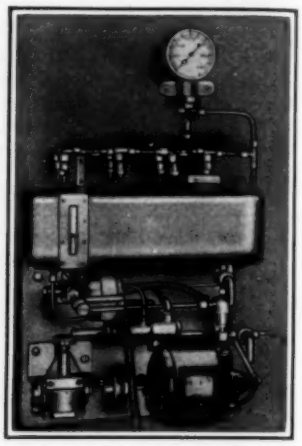
Lubricating System, Centralized, "Dot"

Dot Lubrication Division, Carr Fastener Co., 31 Ames St., Cambridge, Mass. [Vol.67,p. 953]

Any number of bearings upon a machine or group of machines, or upon the line and countershafts through which the machines are driven, may be oiled simultaneously from the central point with this apparatus.

The system comprises four elements: A pump or other means to introduce the oil; a metering valve, one of which is affixed to each bearing to be oiled; a knuckle relief valve to release the pressure built up in the line by the pump; and the necessary pipe and fittings.

The main feature of the system is the metering valve, which delivers a measured amount of oil to the individual bearings it serves upon each rise



of pressure in the system. Having passed through a cycle, the valve cannot deliver more oil until the pressure in the line has fallen below the initial amount necessary to start its action.

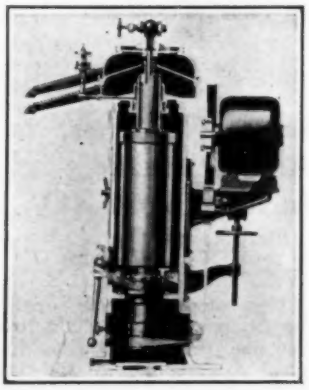
When the system is arranged for hand operation, the oil is introduced through the relief valve by means of a hand pump or an oil pressure gun. The system may also be furnished with a power-driven pump run by a small electric motor, in which case the functions are automatic. The motor is started by a push button at predetermined intervals. The motor, pump, release valve and oil reservoir are mounted upon a panel, as shown in the illustration.

— 374 —

Separator and Clarifier for Cutting and Lubricating Oils

"Positive" Machinery Division, National Acme Co., Cleveland, Ohio. [Vol.67,p.1038]

This centrifugal separator, which is easily convertible into a filtering clarifier, is for particular use with batteries of machine tools using quantities of cutting oil or compound. It is intended to take coolant that has been passed through the ordinary gravity or centrifugal chip separator, and to remove from it all of the foreign matter that



remains, such as fine particles of metal.

The unit consists of revolving tubes or sleeves through which the liquid flows, and against the inner surfaces of which it is held by centrifugal force. This action drives from the surface of the cylinder the heavy foreign matter, and at the same time the liquid is driven lengthwise along the tubes before it is discharged. In this travel it is thoroughly rid of all particles originally held in suspension.

Dams or rings of suitable height hold back the sludge or the impurities, which can be cleaned from the inner surface of the tubes from time to time.

When used as a clarifier, a sleeve of filter paper or of similar material is placed between the inner and outer revolving sleeves to eliminate even the finest foreign matter.

Miscellaneous Equipment, Supplies and Materials

— 375 —

Airbrush, Touch-up

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill. [Vol.67,p.639]

The touch-up airbrush, illustrated, was designed for coloring, antiquing, stippling, stenciling, veiling and tinting various articles requiring a "selling finish." The airbrush is

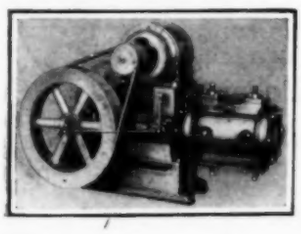
said to be non-clogging and has a triple action. It provides a spray varying in width from a fine line to a wide one. It is fully guaranteed by the manufacturer.

— 376 —

Air Compressors with Texrope Drive

Pennsylvania Pump & Compressor Co., Easton, Pa. [Vol. 67,p.294]

The horizontal, double-acting air compressors are being equipped with Texrope drives, manufactured by the Allis-Chalmers Manufacturing Co., in order to reduce the floor space. Inexpensive maintenance and quiet operation are also claimed.



The drive consists of a number of flexible V-shaped, rubber-fabric belts operating in grooved sheaves, similar to a rope drive. It is possible to use short centers without slippage. No idler is necessary and the motor can be set close to the frame of the compressor.

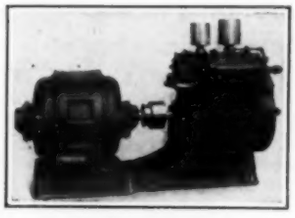
Where space is extremely limited, the motor may be mounted directly on top of the compressor.

— 377 —

Air Compressors, Vertical, of Small Capacity

Sullivan Machinery Co., 128 S. Michigan Ave., Chicago, Ill. [Vol.67,p.995]

For shop, power plant, and miscellaneous industrial plants where a relatively small amount of compressed air is needed, and where compactness, continuous operation, and practically automatic control are important factors, two vertical direct motor-driven air compressors of



the two-cylinder and four-cylinder types, were designed. Both machines are single acting.

In the two-cylinder machine, the cylinders are cast in one block, and the Wafer valves for both inlet and discharge are placed in recesses of the cylinder head. The two cranks are placed 180 deg. apart with opposed counterweights.

The four-cylinder compressor has the four cylinders placed in pairs at an angle of 90 deg. with each other, forming a V-type arrangement. The two connecting rods for opposite cylinders are attached side by side on one crankpin, so that only two cranks are required. Other features of the design are similar to those of the two-cylinder compressor. The speeds of the two machines are the same, and the capacities 120 and 240 cu.ft. of free air per min., respectively.

Direct and alternating current motors, together with control equipment for hand starting and stopping, or for full automatic control are available.

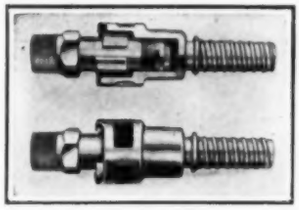
— 378 —

Air Hose Coupling, "Superior"

Robinson Machine Co., Muskegon, Mich. [Vol.67,p.411]

The "Superior" plain-type air hose coupling is made without springs or loose parts, and is connected or disconnected with a quarter turn.

A special treated leather gasket is employed and is expanded by a V-shaped ring when the air pressure is applied.



It is claimed that the gasket is air tight under all pressure conditions, and that it will not stick or corrode nor to pull out of the coupling. It can be adjusted for wear by a slight turn of the nut.

The couplings are made interchangeable in ⅜,- ½- and ¾-in. sizes for pipe and hose lines.

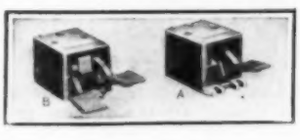
— 379 —

Air Control Valve, "Logan"

Logansport Machine Co., Logansport, Ind. [Vol.67,p.635]

The foot-operated air valves illustrated are intended to simplify the handling of chucking operations. The valve is manufactured in two styles, models G and H, having capacities of ¼, ½, ¾ and 1 in. Both models are of the poppet type, arranged for direct piping to the cylinder. The working parts are hardened and ground, and all parts are accessible for repair.

Model G, shown at *A*, is single-pedal controlled and is designed for the operation of devices where the air is required



on one side of the cylinder piston for a short duration of time only.

Model H, shown at *B*, is designed for the operation of cylinders where air is required on both sides of the piston for a length of time that would not be practical for the operator to maintain his foot on the pedal. One pedal is pushed downward, and the air pressure remains constant until the opposite pedal is pushed downward.

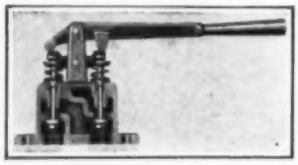
— 380 —

Operating Valves, Pneumatic

Ross Operating Valve Co., 6488 Epworth Blvd., Detroit, Mich. [Vol.67,p.1039]

Three- and four-way operating valves for the control of single- and double-acting air cylinders are being manufactured. The poppet principle, with the air pressure against the poppet, is one feature of the design. They can be furnished in either locking or non-locking types and will find their own neutral or "off" position.

All ports are located on one face, so that the user can mount the valve in a plate to which the piping is attached. This construction makes the piping a permanent installation and in



order to remove the valve it is only necessary to loosen the bolts that hold it in place.

The valve design includes a flexible seat and this eliminates the necessity for lapping or grinding when servicing is required.

Style 5-P is for double-acting cylinders, while Style 3-P is for single-acting cylinders. Both styles are made in four sizes of ⅜, ½, ¾ and 1¼ inch.

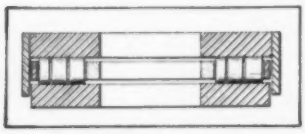
— 381 —

Bearings, Crane-Hook

Rollway Bearing Co., Inc., Syracuse, N. Y. [Vol.67,p.600]

All previous sizes of crane hook bearings made by this company have been superseded by a new list of sizes. The old sizes can still be furnished, however, but the new ones are recommended wherever possible.

The rollers and thrust plates in these bearings are made of high-chrome, high-carbon steel, heat-treated to give uniform hardness throughout the piece. A weather shed, which also



serves as a lubricant retainer, is provided to give the bearing parts the necessary protection. The bearings are made in sizes to fit standard hooks with capacities from 5 to 100 tons. Larger sizes can be furnished on order.

— 382 —

Bearium Processed Rods

Bearium Bearings, 261 Franklin St., Boston, Mass. [Vol.67, p.1035]

Bearium metals are now available in solid rod form for making small bearings and bushings. The rods can be had in sizes from ¼ to 1 in. in diam. in sixteenths, and up to 60 in. in length. The finish of this product is smooth and sufficiently accurate for press fits on bushings and for any machine chucking.

Bearium metal is an improved bearing bronze containing 26 per cent lead. It has an even and dense texture, high tensile strength and high Brinell hardness. A bearing made of this metal may be run dry for several hours without trouble and will run at a red heat without seizure or scoring of either bearing or shaft.

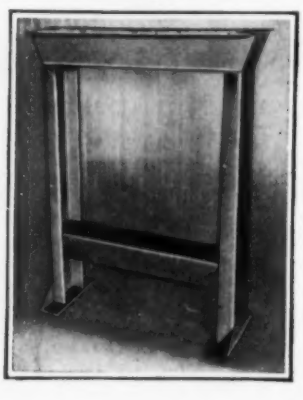
The standard process rod is of B-4 grade, designed for resistance to shock and impacts. The rods were developed particularly for screw machine use.

— 383 —

Bench Legs and Drawers, Welded-Steel

C. & P. Electric Works, Inc., Springfield, Mass. [Vol.67,p. 714]

Electrically-welded steel legs and drawers for factory benches are being made in all standard sizes of No. 16 gage steel. The



various sections are blanked and formed on presses and spot welded together. The features claimed are lightness combined with strength.

The bench leg consists of nine separate pieces. Countersunk holes in the upper flanges provide means to secure them to the bench with wood screws, and holes in the pedestals allow them to be lagged to the floor.

The cover plate at the top of the drawer is beaded over at the edges to form runways in which the outwardly turned flanges at the sides of the drawer may slide. This cover plate is fastened to the under side of the bench.

— 384 —

Blowers, "Heat Killer"

Coppus Engineering Corporation, 344 Park Ave., Worcester, Mass. [Vol.67.p.637]

The blower for industrial use takes its name from the claim of the manufacturers that the refreshing breeze produced by the fan, when thrown into the path of heat radiation, literally

kills the heat. The blast is guided by a long horn-shaped diffuser, and can be directed at hot spots, even in the most inaccessible places. It is a portable, self-contained unit and is made in two sizes.

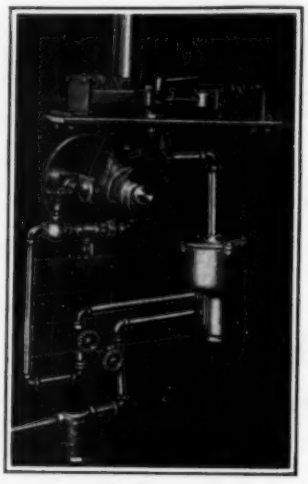
The No. 175 Heat Killer has a ½-hp. universal motor, and can be used with either d.c. or a.c. circuits of 110 or 220 volts. The No. 250 Heat Killer has a 1-hp. motor of any standard type for use on standard commercial circuits. Both units are mounted on a tripod.

— 385 —

Burner, Automatically-Controlled, Mahr-Harris

Mahr Manufacturing Co., Minneapolis, Minn. [Vol.67,p. 871]

Steady operation, close control and uniform temperature at any desired degree of heat are



some of the features of the Mahr-Harris automatically-controlled industrial burner. The device is a combination of control units with the standard Mahr triple atomizing type industrial burner. It is so designed that if for any reason the air supply fails, the control will instantly and automatically shut off the flow of oil to the burner.

The air valve setting is accomplished by electro magnets. When the air valve is closed or opened, the air pressure in the body is reduced or increased. This change in the air pressure immediately and automatically adjusts the fuel valve setting through a special siphon diaphram arrangement in the fuel balancing valves.

The oil unit may be used to balance the burners on opposite sides of a double-end furnace. It is made in sizes that will cover a range of temperatures from the very low temperature required for core baking to the high temperatures required for forging.

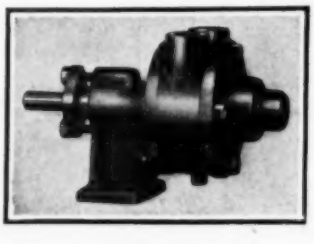
— 386 —

Coolant Pumps. Reversible

Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill. [Vol.67, p.379]

With the model R pump illustrated it is claimed to be possible to reverse the direction of rotation and still maintain a constant direction of flow. The reversing feature of the pump is obtained by the addition of three parts to the standard machine-tool pump made by the company.

This is accomplished by



mounting an idler on a pin which is pressed into the idler carrier. This idler carrier is mounted in the cover and constructed so that it can revolve only 180 deg. A small spring presses the idler carrier against the revolving rotor, and this creates sufficient friction to rotate the idler carrier 180 deg. when the direction of rotation is reversed.

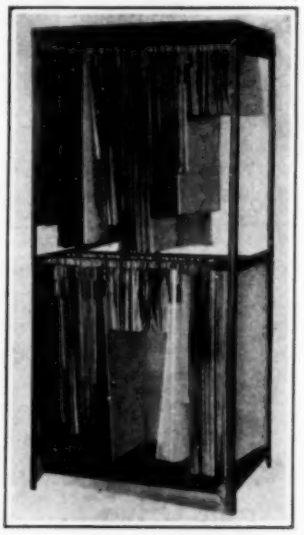
— 387 —

Filing System for Drawings and Maps

Globe-Wernicke Co., Cincinnati, Ohio [Vol.67,p.876]

Increased life and usefulness of a drawing is claimed by the use of this filing system. There is no contact between adjacent sheets and no friction when pulling out or tucking in a sheet. The clip suspension is particularly suited for paper, Ozalid and Van Dyke prints.

The nucleus of the system is a clip composed of a strip of celluloid inclosed in india rubber adhesive cloth. One end of the clip is attached by adhesion to the drawing. The other end contains a hole and slit that permits suspending the sheet by snapping the clip over horizontal rods. The sheets are strung



on an assembly of polished rods mounted in cabinets or in open racks. Ply wood riders are mounted on the rods to enable the contents of the rack to be shifted laterally.

The clips also serve as handles to the drawing. Guide cards provide a visible index.

— 388 —

Furnace, Electric, Globar

C. I. Hayes, 129 Baker St., Providence, R. I. [Vol.67.p.75]

This Globar electric furnace was particularly designed for hardening high-speed steel.

Temperatures ranging from 1,800 to 2,500 deg. F. can be maintained continuously, and up to 2,800 deg. F. intermittently. The furnace is of the resistance type. It may be operated on either a.c. or d.c. at voltages up to 220, or 550 volts on a.c. lines only.

The heating elements are in the form of rods, and may be mounted in the top of the heating chamber, under the hearth,

or in both places. These elements, or Globars, are supported between two special alloy bars which extend out through the side or end walls and through which contacts are made.

The furnace temperatures may be controlled either by hand or automatically. The furnace is made in two standard sizes: Type HG 1 has a chamber 4x8 in. section by 12 in. long, while the HG 2 has a chamber 6x10x18 inches.

— 389 —

Furnace, Annealing, Continuous

W. S. Rockwell Co., 50 Church St., New York, N. Y. [Vol.67,p.557]

This conveyor-type furnace is for annealing and heat-treating ferrous and non-ferrous metal parts without the use of trays.

An alloy metal conveyor of special design permits charging

at random, movement without distortion through the furnace and delivery to a shower or bath for cooling. For normalizing, the stock is cooled individually by the circulation of air. The control of time and rate of heating and cooling, as well as temperature, is automatic.

Electricity, oil or gas, with provision for automatic control, may be used for generating the heat with corresponding changes in detail design of the furnace. The size of chamber and working openings and the details of the conveyor construction also vary with individual requirements.

In general, the construction throughout is unusually heavy to provide for ample heat storage and insulation. When fuel is employed as a source of heat, the spent gases are utilized to preheat the stock and to preheat the air for combustion.

— 390 —

Gears, Hardened and Ground

Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass. [Vol.67,p.635]

A line of standardized spur pinions with hardened and ground teeth is announced. The gears are ground on a generating type machine to insure accuracy and correct tooth form. All warping due to hardening is eliminated by the grinding process, resulting in increased capacity and durability.

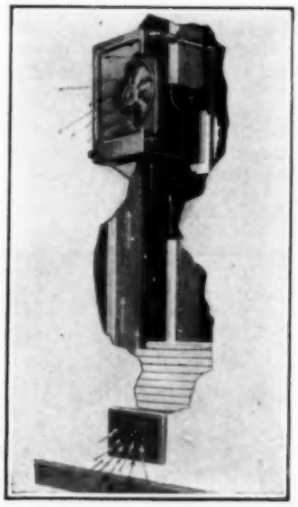
The grinding process makes possible the use of alloy steel, which would not otherwise be possible on account of excessive warpage after hardening. A finer pitch can also be used. The gears are especially adaptable for heavy-duty service.

— 391 —

Heater, Unit, No. 2 "Venturafin"

American Blower Co., Detroit, Mich. [Vol.67,p.795]

This No. 2 "Venturafin" unit heater is particularly adapted for small areas for which the larger units cannot be used on



account of their excess heating capacity. The No. 2 unit is recommended for offices, small store rooms, garages, and small shops.

The unit measures 22¾ in. high, 14¾ in. wide, and 12¾ in. deep. It delivers 450 to 900 cu.ft. of heated air per min., representing a heating capacity equal to 125 to 200 sq.ft. of direct radiation. Like the larger units made by this company, it consists of a series of steam pipes through which air is blown. The cold air is drawn from a point near the floor where it naturally collects.

— 392 —

High-Speed Steel, "Clarite," Improved

Columbia Tool Steel Co., Chicago Heights, Ill. [Vol.67,p.564]

The quality of "Clarite" high-speed steel has been improved so that an increase of 5 per cent in production can be obtained. The steel is also said to be stronger and more flexible than that made under the old formula.

This high-alloy steel differs from the old Clarite principally in a marked increase in vanadium and a small reduction in tungsten. It is hardened at a temperature between 2,350 and 2,450 deg. F., and drawn at between 1,050 and 1,100 deg. F. The new steel takes a full hardness at a slightly lower temperature than the old.

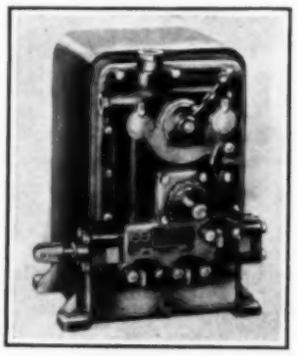
— 393 —

Hydraulic Pump, Type "QS"

Oilgear Co., Milwaukee, Wis. [Vol.67,p.37]

The improved type "QS" pump was designed especially for hydraulic feeds on milling, boring, drilling and similar machines.

The feeding delivery is adjustable and the forward and reverse feeds are always equal.



Control is by hand or automatically by a cam. The control valve has positions corresponding to the following functions: Full traverse forward, feed forward, neutral, feed reverse and rapid return.

When used with a two-to-one differential cylinder, 3¾ in. in diam., this pump will give a feeding range from 1.66 to 23 in. per min. forward and from 3.32 to 46 in. per min. reverse, with a corresponding rapid traverse speed of 93 in. per min. in either direction.

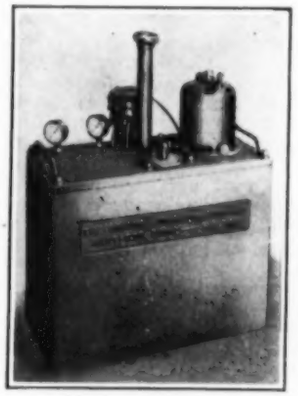
The maximum working pressure is 1,000 lb. per sq.in. The power consumption at maximum capacity is 2 hp., while the operating speed of the pump is 860 r.p.m. or lower.

— 394 —

Hydraulic Unit to Operate Chucks

Gridley Machine Co., Hartford, Conn. [Vol.67,p.1033]

The purpose of this self-contained hydraulic device is to operate the chucks of screw machines, chucking machines, automatic lathes and other production machinery. The device



consists of a cast-iron tank to hold a quantity of oil, and a cover to which is attached a motor-driven pump, an accumulator in which air pressure can be built up, suitable gages to indicate pressure, and valves to regulate the flow of oil.

Oil is delivered by the pump to the accumulator chamber through a special valve, the function of which is to allow oil to pass freely to the accumulator, and at the same time to maintain full-delivery pressure upon the chuck cylinder. To open the chuck, the operator presses a push button on the machine, causing a solenoid-operated valve to open and allow the oil contained in the chuck cylinder to discharge into the tank. When pressure upon the button is released, the valve puts the cylinder in direct communication with the accumulator, thus filling it instantly with oil. The pump then holds the chuck closed by hydrostatic pressure.

The device occupies a floor space of 12x24 in., and stands 18 in. high. An outfit includes a cylinder to be substituted for the air cylinder of the chuck to which it is to be applied.

— 395 —

Jacks, Hydraulic

Blackhawk Manufacturing Co., Milwaukee, Wis. [Vol.67, p.172]

A line of hydraulic jacks, using oil as a lifting medium, in sizes 1½ to 60 tons, is announced. The pump unit and ball check valve are built on the outside of the jack, where they are easily accessible. The release valve is entirely separate

from the pump, so as to prevent accidental lowering. By turning the release valve, the operator can automatically lower the load, fast or slow as desired, and the control is positive at all times.

The heavy-duty jacks are equipped with two pumps, one being a low-pressure pump to raise the plunger quickly to the point of contact.

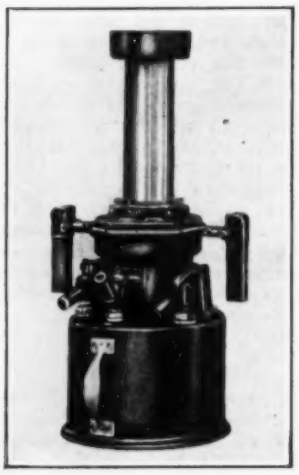
The complete line consists of ten models in nine capacities. The industrial models range from 18 to 60 tons.

— 396 —

Hydraulic Jack, 75-ton

Blackhawk Manufacturing Co., Milwaukee, Wis. [Vol.67, p.957]

A 75-ton model has been added to the line of hydraulic jacks made by this company. The industrial models formerly ranged in size from 18 to 60 tons. This 75-ton jack, known



as model G-18, weighs 200 lb., and is equipped with special carrying handles to enable two men to carry it.

The collapsed height is 18 in., and the lift is 10 in. The jack is equipped with two pumps; a speed pump to quickly raise the plunger to the point of contact, and a power pump to raise the load. The load is automatically lowered at any desired speed. The release valve is entirely separate from the pump and is designed to prevent accidental lowering.

All working parts are built on the outside of the jack. A patented check valve is featured.

— 397 —

Lacquers, Industrial

Hilo Varnish Corporation, Marcy & Flushing Aves., Brooklyn, N. Y. [Vol.67,p.485]

These lacquers are said to be made from the purest and most suitable raw materials and have a mild, harmless odor when fresh. The tendency to blush has been practically eliminated, and the finishes may be used under adverse weather conditions. The tendency to lift undercoats is said to be reduced to a minimum. It takes three to four hours to dry between coats.

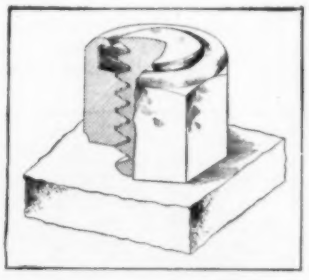
The lacquer is made in several grades of finishes and for both spraying and brushing. The lacquers are available in all colors, as well as black and white.

— 398 —

Locknut, "Elastic Stop"

American Gas Accumulator Co., 100 E. 42nd St., New York, N. Y. [Vol.67,p.174]

The "Elastic Stop" safety locknut contains an elastic cushion or disk of hard vul-



canized fiber securely held within the body of the nut by a spun-down flange. The hole through the disk is somewhat smaller than the outside diameter of the bolt, and is not threaded.

When the bolt meets resistance from the cushion, it is pressed backward so that the contact between the nut and screw takes place on those flanks of the thread that sustain the pressure after the nut is drawn home against the support. This backward pressure forms a friction resistance that is said to be sufficient to keep the nut from turning. When the bolt is removed, the cushion expands to its original position.

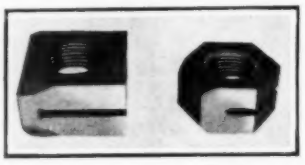
— 399 —

Locknut, "Chapnut"

National Nut & Bolt Co., North Easton, Mass. [Vol.67, p.251]

It is claimed that this type of self-locking nut will withstand any amount of vibration without working loose. The nut is made in all commercial sizes from $\frac{5}{16}$ to $\frac{3}{4}$ in., both square and hexagon, and may be furnished in black, polished, nickeled, galvanized or case-hardened finishes.

The nuts are made of a specially selected steel. The nuts are made of strip stock by fold-



ing it upon itself to leave a space between the two leaves. After being folded, the blanks are drilled and tapped. The final operation is to effect a partial closing of the space between the leaves and throw the two parts of the tapped hole slightly out of alignment, thus making a spring clamping effect when the nut is placed upon a bolt.

— 400 —

Magnet, Type SA

Electric Controller & Manufacturing Co., Cleveland, Ohio. [Vol.67,p.332]

The type SA lifting magnet has a coil spider of composite construction with a body of cast steel and a flange of cold rolled brass. The outer pole shoe is extended upwards to fit against a machined surface on the outside of the magnet housing, to prevent pole shoe breakage.

A steel plate, ¼ in. in thickness, is bolted at the top of the magnet to prevent injury to the incoming lead-wires from the crushing effect of the crane hook and chains.

— 401 —

Melting Pot, Small-Capacity

General Electric Co., Schenectady, N. Y. [Vol.67,p.380]

The electric melting pot is for melting solder, lead, babbitt or tin, and has a capacity from 27 to 40 lb., according to the

metal to be melted. This pot may be operated on either 110- or 220-volt a.c. or d.c. circuits, and is made in 750- and 1,000-watt ratings.

The melting pot consists of a sheet steel cylindrical casing in which is supported a cast-iron crucible 4-in. deep and 6 in. in diam. The space between the crucible is insulated, and the heating units are of the cast-in, sheath-wire type. One unit is used in each pot. The leads of the unit are brought over the top of the pot into a connection box.

The pot is designed for melting metals at a temperature not exceeding 950 deg. Fahrenheit.

— 402 —

Melting Pot, Direct Jet, No. 15

Johnson Gas Appliance Co., Cedar Rapids, Iowa. [Vol.67, p.681]

Small quantities of lead or metal can be melted in the No. 15 direct-jet furnace. It is of durable construction and is said to give a high heating efficiency

with small gas consumption. It will melt its capacity of lead in less than ten minutes.

The pot is provided with a pouring spout and handle. It is made of cast iron and 5¼ in. in diam. by 3 in. deep. It has a capacity for 18 lb. of lead.

The burner is a direct-jet Bunsen-burner type with shut-off valve and pilot light. It consumes 15 cu.ft. of gas per hour.

— 403 —

Paint Spray Equipment, Extension

Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md. [Vol.67,p.252]

The paint spray extension equipment is of particular use in painting ceilings, high walls, tanks, freight cars, and similar

high surfaces without the use of many ladders or scaffoldings.

The regular extension is 8 ft. in length, but any length of extension can be furnished upon specification. The unit consists of the extension and standard Milburn type E gun, a pressure feed tank with regulators, and 25 ft. of air and paint hose. The extension is ruggedly constructed of strong tubing.

— 404 —

Pen Attachment

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.67,p.875]

This pen attachment is for use with this company's universal divider No. 843 with the No. 845 steel beam trammels. The knurled handle from a trammel can be screwed in a

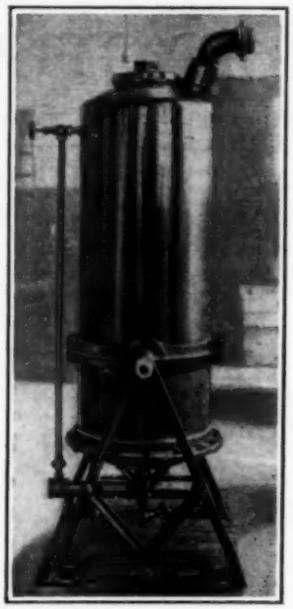
tapped hole in the pen attachment. This attachment is well made and is useful for enabling the draftsman to draw accurate circles, arcs and fillets.

— 405 —

"Phomene Accumulator"

Pyrene Manufacturing Co., 560 Belmont Ave., Newark, N. J. [Vol.67,p.834]

A device for extinguishing fires in oil, gasoline, paint, lacquers and other inflammable liquids has been put out under the trade name "Phomene Accumulator." The principle of operation is the smothering of



the flame with large quantities of foam.

The pipe at the bottom of the accumulator tank is connected to the water supply, and a foam distributing line is run to the hazard. In the accumulator is placed a charge of dry powder. When the valve in the water line is opened, foam is generated. It is possible to operate the valve either manually or automatically by a thermostatic device.

The tank contains 275 lb. of powder and delivers 2,400 gal. of foam at average water pressure and temperature. The foam floats on liquid surfaces and adheres to solid surfaces, either horizontal or vertical. It is neutral and will not do any damage of itself.

— 406 —

Reel, Traversing

Standard Machinery Co., Auburn, R. I. [Vol.67,p.410]

This traversing reel is designed to be used for spooling

wire taken from a small rolling mill or wire-drawing machine. The spool on which the material is being wound is traversed back and forth by means of an adjustable eccentric disk. This mechanism coils the wire evenly regardless of the diameter of the spool. The amount of traverse per turn of the spool can be varied. The traverse motion reverse can also be adjusted at the end of the spool so as to suit any diameter of wire.

These reels are built in two sizes, and cover a range from very small wire or ribbon up to diameters or widths as large as $\frac{5}{16}$ inch.

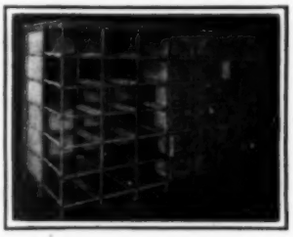
— 407 —

Stock Racks, "Sturdy-Sectional"

Skinner Chuck Co., New Britain, Conn. [Vol.67p.637]

Ease of assembly, together with the convenience of adding additional drawer capacity from time to time, is one of the features of these "Sturdy-Sectional" stock racks. The braces are made of cast iron and are assembled by means of stove bolts and a special locking device.

Welded steel drawers, 8x12x 20 in. in size, are regularly provided, and can be obtained with



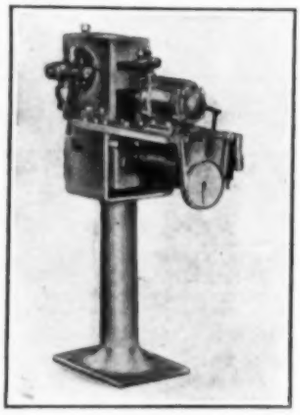
compartments if desired. These drawers can be supplied with drop or stationary handles. They can also be furnished liquid tight. The drawers travel on rollers set in the frame.

— 408 —

Valve Control, Hydraulic, Automatic, "Yarway"

Yarnall-Waring Co., Philadelphia, Pa. [Vol.67,p.636]

Although the automatic two-pressure hydraulic valve control, illustrated, was designed for particular use in connection with Bakelite presses, it can be modified to take care of any heavy-duty press where it is desirable to use two pressures and to maintain a definite time element. With this device the ram is rapidly advanced to its working position under low pressure, is placed under high-pressure while performing its work, and is returned to its loading position.



The mechanism consists of a hydraulically-operated plunger for operating the valve through a rack and pinion and a motor-driven notched cam for controlling the plunger travel. A small a.c. motor is used to drive the cam through suitable reduction gears. After the entire cycle of four movements is completed, the motor stops.

By varying the locations of the notches in the cam and its speed of rotation, through the gearing, it is possible to obtain a wide variety of cycles.

— 409 —

Toggle, Pressure

V. & O. Press Co., Hudson, N. Y. [Vol.67,p.638]

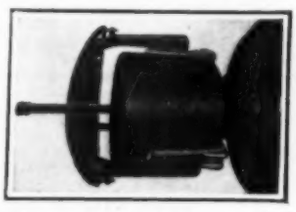
The King pressure toggle, formerly made by R. D. King, Chicago, Ill., is now being manufactured by this company. The device was previously described on page 766, Vol. 48, of the *American Machinist*. This spring control toggle is intended for use on press work to maintain a comparatively uniform pressure over a considerable range of stroke.

— 410 —

Wheel Puller with Extension Jaw

Crane Puller Co., Waltham, Mass. [Vol.67,p.209]

Extension jaws of two sizes are being supplied by the above company for use with its wheel



puller. This device is especially designed for removing wide-faced paper pulleys.

The No. 3 size extension jaw takes pulleys 18 in. in diam. x 22 in. face, while the No. 3 size takes pulleys 24 in. in diam. x 26 in. face.

INDEX OF MANUFACTURERS

American Edition

—— A ——

	No.	Page
Abrasive Machine Tool Co., Providence, R. I.		
Surface grinding machine, No. 5	56	88
Duplex wheel head for abrasive grinder	57	88
Adams Co., Dubuque, Iowa		
Gear hobber and thread miller, No. 5	42	85
Acme Electric Welder Co., Los Angeles, Calif.		
Type C spot welders	246	118
Acme Machine Tool Co., Cincinnati, Ohio		
Full universal brass turret lathe, 20-inch	120	97
Heavy universal turret lathe with duo control	122	98
A. F. K. Fountain Works, 375 Reed St., Milwaukee, Wis.		
Vise support	328	130
Ajax Flexible Coupling Co., Westfield, N. Y.		
Flexible coupling	334	131
Allen-Bradley Co., Milwaukee, Wis.		
Push-button starters	358	134
American Blower Co., 6000 Russell St., Detroit, Mich.		
Venturafin No. 2 unit heaters	391	139
American Engineering Co., Philadelphia, Pa.		
"Quick-lift" ½-ton electric hoist	270	122
American Gas Accumulator Co., Elizabeth, N. J.		
"Elastic Stop" locknut	398	140
American Saw Mill Machinery Co., Hackettstown, N. J.		
"Monarch" ball-bearing bench saw	283	124
American Swiss File and Tool Co., Elizabeth, N. J.		
Small tools	322	130
Ames, B. C., Co., Waltham, Mass.		
Micrometer dial indicator	289	125
Dial gage for sheet metal	290	125
Ampco Twist Drill Co., Jackson, Mich.		
Melling "Mill-Drill-Matic" machines	150	103
Anderson Bros. Manufacturing Co., Rockford, Ill.		
Spotter	211	113
Power scraper	265	122
Anderson Die Machine Co., Bridgeport, Conn.		
Dial-feed tapping machine	187	109
Artos Engineering Co., 69 Wisconsin St., Milwaukee, Wis.		
Automatic wire cutting and stripping machine	250	119
Atlantic Machine & Tool Co., 28 Canfield St., Orange, N. J.		
Tool post grinder	138	101
Automotive Maintenance Machinery Co., 549 W. Washington St., Chicago, Ill.		
"Ammco" rigid cylinder grinder	109	96
"Ammco" radial cylinder grinder stand	110	96

—— A —— (Continued)

	No.	Page
Automatic Nut-Thread Corporation, 24 West Tupper St., Buffalo, N. Y.		
"Threadnut" No. 2 nut tapping machine	196	111

—— B ——

	No.	Page
Baker Bros., Inc., Toledo, Ohio		
Hydraulic feed boring and drilling machine, 25 H	6	79
Baker-Raulang Co., Cleveland, Ohio		
Tin plate truck	277	123
Badger Tool Co. Beloit, Wis.		
Modified No. 224 double-spindle face grinder	48	86
Face grinding machine, No. 8	49	87
Barber-Colman Co., Rockford, Ill.		
Reamer sharpener	86	92
Bardons & Oliver, Cleveland, Ohio		
Cutting-off machine	255	120
Barnes Drill Co., 814 Chestnut St., Rockford, Ill.		
Single-spindle honing machine	261	121
Barnes, W. F. & John, Co., Rockford, Ill.		
Horizontal duplex boring machines	5	79
Barrett Machine Tool Co., Meadville, Pa.		
Adjustable horizontal boring machine	4	79
Bath, John, & Co., Worcester, Mass.		
Acme- and square-thread ground taps	314	129
Bearium Bearings, 261 Franklin St., Boston, Mass.		
Bearium processed rods	382	138
Besly, Chas. H., & Co., 118 North Clinton St., Chicago, Ill.		
Dry disk grinder, No. 161	60	88
Dry disk grinder with semi-automatic feed, No. 6	61	89
Vertical-spindle motor-driven grinder, No. 309	62	89
Nut-burring fixture for No. 49 grinder	111	96
Bethel-Player Co., Westboro, Mass.		
Tapping head and "Newgrit" abrasive	263	121
Bilton Machine Tool Co., Bridgeport, Conn.		
Improved Pro-Ducto-Matic	148	102
Pro-Ducto-Matic with two-spindle angular cutter block	149	103
Black & Decker Manufacturing Co., Towson, Md.		
Special ¼-inch ball-bearing electric drill	31	84
Radial arm for portable electric tools	36	84
Combination grinder	76	91
Electric hammer	216	114

—— B —— (Continued)

	No.	Page
Blackhawk Manufacturing Co., Milwaukee, Wis.		
Hydraulic jacks	395	140
Hydraulic jack, 75-ton	396	140
Blanchard Machine Co., 64 State St., Cambridge, Mass.		
Magnetic chuck, 36-inch	96	94
Grinding wheels	101	95
Bliss, E. W., & Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.		
High-speed press	169	106
Large-size, double-crank press	172	106
High-speed punch press	173	107
Blount, J. G., Co., Everett, Mass.		
Motor-driven grinders and buffers	73	91
Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass.		
Hardened and ground gears	390	139
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.		
Type 94 heavy-duty face grinder	51	87
Brown & Sharpe Manufacturing Co., Providence, R. I.		
Surface grinding machine, No. 2	99	94
Circular forming tool grinding equipment	104	95
Attachment for No. 2 surface grinding machine	108	95
Micrometer caliper, No. 11	291	125
Pen Attachment	404	141
Bryant Chucking Grinder Co., Springfield, Vt.		
Semi-automatic hole grinder, No. 3	69	90
Semi-automatic hole grinder, No. 12	70	90
Grinding machine for brake drums	88	93
Special No. 20 grinder	89	93
Bullard Machine Tool Co., Bridgeport, Conn.		
Six-spindle Mult-Au-Matic, 20-inch	3	79
Automatic vertical turret lathe	123	98
Contin-U-Matic center lathe	132	99
Buckeye Portable Tool Co., 131-135 Wayne Ave., Dayton, Ohio		
Automatic screwdriver	227	115
Polisher and grinder, No. 63	78	91
Burke Machine Tool Co., Conneaut, Ohio		
Bench milling machines, Nos. 3 and 4	143	102

—— C ——

	No.	Page
C. & P. Electric Works, Inc., Springfield, Mass.		
Welded steel bench legs and drawers	383	138
Campbell, Andrew C., Bridgeport, Conn.		
Nibbling machine, No. 1-A	185	109
Canedy-Otto Manufacturing Co., Chicago Heights, Ill.		
High-speed sensitive bench drill	18	82
Carborundum Co., Niagara Falls, N. Y.		
Aloxite "AA" grinding wheel	102	95
Improved internal grinding wheel	103	95

— C —
(Continued)

No. Page

Car Fastener Co., Dot Lubrication Division,
31 Ames St., Cambridge, Mass.
"Dot-o-Matic" pressure cup for grease 372 136
Dot centralized lubricating system 373 136

Chambersburg Engineering Co.,
Chambersburg, Pa.
Large-size steam drop hammer..212 113
High frame hammers 215 114

Chisholm-Moore Manufacturing Co.,
Cleveland, Ohio
Model K cyclone hoist 272 123

Cincinnati Bickford Tool Co.
Oakley, Cincinnati, Ohio
"Super Service" production drill 16 81

Cincinnati Electrical Tool Co.,
Cincinnati, Ohio
Type UR ⅜-inch electric drill.. 27 83

Cincinnati Grinders Incorporated,
Cincinnati, Ohio
Brake drum grinder..... 87 93
Spindle grinder..... 93 94

Cincinnati Lathe & Tool Co.,
Cincinnati, Ohio
Geared-head lathes 116 97

Cincinnati Milling Machine Co.,
Cincinnati, Ohio
"Giant Hydromatic" milling machine 145 102

Cincinnati Planer Co.,
Cincinnati, Ohio
Forming planer 152 103
Rail guide planer 154 103

Cincinnati Shaper Co.,
Cincinnati, Ohio
Gear burnishing machine 46 86
Rapid traverse shaper 155 104

Clark, Jas., Jr., Electric Co.,
Louisville, Ky.
Automatic switch for hand grinders 82 92
Portable tools 258 120

Clark Tractor Co.,
Battle Creek, Mich.
Steel trailer with rubber-tired wheels 275 123

Cleveland Planer Co.,
Cleveland, Ohio
Improved open-side planer.....151 103

Cleveland Pneumatic Tool Co.,
Cleveland, Ohio
"Cleco" riveting hammer.....217 114

Cleveland Punch & Shear Co.,
Cleveland, Ohio
Combination punching and shearing machine 181 108

Cochrane-Bly Co.,
Rochester, N. Y.
Improved No. 66 metal sawing machine 222 115
Semi-automatic high-speed cut-off saw, No. 21.....223 115
Portable filing machine, No. 1..259 121

Columbia Machine Tool Co.,
Hamilton, Ohio
Improved heavy-duty shapers..161 105

Columbus Tool Steel Co.,
Chicago Heights, Ill.
Improved "Clarite" high-speed steel 392 139

Cone Automatic Machine Co.,
Windsor, Vt.
Worm hobbing attachment for Cone automatic 41 85

— D —
(Continued)

No. Page

Consolidated Machine Tool Corporation of America,
Rochester, N. Y.
Betts large-size double horizontal boring and drilling machine 9 80
Rise and fall milling machine...146 102

Coppus Engineering Corporation,
Worcester, Mass.
"Heat Killer" blowers.....384 138

Crane Puller Co.,
Waltham, Mass.
Wheel puller 410 141

Crankshaft Machine Co.,
Jackson, Mich.
Melling crankshaft cheek-facing and pin-turning lathe 128 99

Cutler-Hammer Manufacturing Co.,
1230 St. Paul Ave., Milwaukee, Wis.
Across-the-Line starter for 5-hp. motors 355 134
Mill-type contactor 356 134
Unbreakable plug 369 136

— D —

Danly Machine Specialties, Inc.,
2104 South 52nd Ave., Chicago, Ill.
Transparent templets 326 130

Defiance Machine Works,
Defiance, Ohio
Vertical grinding and polishing machine, No. 725 ..... 58 88
Vertical 60-ton hydraulic press, No. 727 .....178 107
Motor-driven flexible belt polishing machine, No. 726 .....208 112
Vertical double spindle shaping machine, No. 723 .....284 124

Demco, Inc.,
105 South Calvert St., Baltimore, Md.
Drill press vise, 4-point..... 37 85

Demco Drilling Machines, Division of Merit Oil Equipment Co.,
6616 Morgan Ave., Cleveland, Ohio
High-speed, unit-type drilling and tapping head 25 83

Detroit Power Screwdriver Co.,
419 Riopelle St., Detroit, Mich.
Power screwdriver with magazine feed 228 116

Diamond Machine Co.,
Providence, R. I.
Face grinding machine with oil-driven table 50 87

Dickerman Hoist Manufacturing Co.,
872 East 72nd St., Cleveland, Ohio
Spur-geared ball-bearing hoist..273 123

Dreis & Krump Manufacturing Co.,
Chicago, Ill.
Steel forming presses.....175 107

— E —

Eastern Machine Screw Corporation,
New Haven, Conn.
H&G style EE diehead.....312 128

Eastern Tube & Tool Co., Inc.,
594 Johnson Ave., Brooklyn, N. Y.
"Ettco" keyless drill chuck..... 34 84
"Ettco" high-speed tapping attachment, No. 3.....201 111

Eclipse Counterbore Co.,
Detroit, Mich.
Multi-diameter cutter 305 128

— E —
(Continued)

No. Page

Electric Controller & Manufacturing Co.,
2700 East 79th St., Cleveland, Ohio
Inclosed type ZO across-the-line starting switches 362 135
Type SA lifting magnet.....400 140

Elwell-Parker Electric Co.,
Cleveland, Ohio
Light tier tructor.....274 123

Engraving Machine Manufacturing Co.,
1960 Broadway, New York, N. Y.
"Sixtus" engraving machine....205 112

Espen-Lucas Machine Works,
Front St., and Girard Ave., Philadelphia, Pa.
Semi-automatic, general-purpose sawing machine 225 115
Semi-automatic, high-speed production sawing machine.....226 115

— F —

Fairbanks, Morse & Co.,
Chicago, Ill.
Self-ventilated inclosed motors..350 133
Variable-leakage double squirrel-cage motor.....351 133

Farrell Foundry & Machine Co.,
344 Vulcan St., Buffalo, N. Y.
Large gear cutters..... 47 86

Fay, J. A., & Egan Co.,
Cincinnati, Ohio
Static balancing machine.....285 125

Fellows Gear Shaper Co.,
Springfield, Vt.
High-speed gear shaper..... 45 86

Ferner, R. Y. Co.,
Investment Bldg., Washington, D. C.
Société Genevoise jig boring machine, No. 7..... 12 81
Société Genevoise jig boring machine, No. 3..... 13 81
Société Genevoise high-speed type of drum dividing machine....257 120

Foote Bros. Gear & Machine Co.,
215 N. Curtis St., Chicago, Ill.
"Moderntype" worm gearing....338 131

Foote-Burt Co.,
Cleveland, Ohio
Footburt No. 15½-F Multiple-spindle drilling machine..... 21 82
Footburt broaching machine....202 111

Forbes & Myers,
172 Union St., Worcester, Mass.
Improved frequency changer...352 133

Fosdick Machine Tool Co.,
Cincinnati, Ohio
Heavy-duty radial drill..... 19 82
Friction tapper.....200 111

Foster Machine Co.,
Elkhart, Ind.
Hydraulically-operated chuck for turret lathe.....135 100
Universal turret lathe, No. 5..119 97

Foster-Johnson Reamer Co.,
Elkhart, Ind.
Triple-valve reamer guide.....310 128

Frew Machine Co.,
124 Venango St., Philadelphia, Pa.
Oval chuck.....140 101

Fusion Welding Corporation,
103rd St. & Torrence Ave., Chicago, Ill.
"Fuzon" electric welder.....342 132
"Fuzon" No. 300 motor-driven arc welder.....343 132
"Fuzon" electrode holder.....345 132

—— G ——

	No.	Page
Gairing Tool Co., Detroit, Mich.		
Inserted-blade reamer and boring tools	306	128
Gallmeyer & Livingston Co., Grand Rapids, Mich.		
Surface grinder with hydraulic feed	55	88
Grand Rapids No. 1½ universal cutter and tool grinder	83	92
Jointer, 8-in.	279	124
Combination universal saw and 8-inch jointer, No. 128	280	124
Motor-on-arbor saw bench	282	124
Gammons-Holman Co., Manchester, Conn.		
"Duplex" taper reamers	309	128
Gardner Machine Co., Beloit, Wis.		
Hydraulic surface grinder, No. 89	54	87
Mechanically-oscillating work table	106	95
Gaterman, W., Manufacturing Co., Manitowoc, Wis.		
Pneumatic tapping machine	189	109
Heavy-duty pneumatic oscillating tapper	192	110
General Electric Co., Schenectady, N. Y.		
Automatic welder for metal railroad ties	242	118
Atomic-hydrogen welding outfit	340	132
Single-operator type welder	344	132
Totally-inclosed hoist motors	348	133
Small limit switch	354	134
Time-delay push-button station	357	134
Small reversing switches	361	135
Single-phase watthour meter	363	135
New A-C and D-C solenoids	364	135
Melting pot of small capacity	401	140
Geometric Tool Co., New Haven, Conn.		
Die-head, style KH	313	129
Gibb Welding Machines Co., Bay City, Mich.		
Welding press	248	119
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.		
Planer-type horizontal boring machine	8	80
Gisholt Machine Co., Madison, Wis.		
Turret lathe, 2L	121	97
Turret lathe, 1L	126	98
Gleason Works, Rochester, N. Y.		
Manufacturing spiral bevel gear generator, 10-inch	43	86
Spiral bevel gear planing generator, 60-inch	44	86
Bevel gear testing machine, 90-inch	304	127
Glenzer, J. C., Co., 6463 Epworth Blvd., Detroit, Mich.		
"Wiard" quick-change chuck	318	129
Globe-Wernicke Co., Cincinnati, Ohio		
Filing system for drawings	387	138
Gorton, George, Machine Co., Racine, Wis.		
Universal die-sinking and engraving machine, No. 3-X	203	112
Tire mold lettering machine, No. 3-H	204	112
Gould & Eberhardt, Newark, N. J.		
Improved manufacturing shaper	158	104
Greenfield Tap & Die Corporation, Greenfield, Mass.		
Universal cutter and reamer grinder, No. 3	85	92

—— G ——

(Continued)

	No.	Page
Greenlee Bros. & Co., Rockford, Ill.		
Four-spindle automatic screw machine	237	117
Gridley Machine Co., Hartford, Conn.		
Hydraulic unit to operate chucks	394	139
Groetchen Tool & Manufacturing Co., 721 Fulton St., Chicago, Ill.		
"Copper Head" laps	320	129

—— H ——

Hammond Manufacturing Co., Cleveland, Ohio		
Automatic tapping machines	186	109
Hayes, C. I., 129 Baker St., Providence, R. I.		
Globar electric furnaces	388	138
Heald Machine Co., Worcester, Mass.		
Rotary surface grinder, No. 25A	53	87
Duplex Size-Matic internal grinding machine	67	90
Size-Matic internal grinding machine for short work, No. 72A	68	90
Hendey Machine Co., Torrington, Conn.		
Geared-head lathe, 12-speed	114	96
Shaper, 32-inch	159	104
Hilo Varnish Corporation, Marcy & Flushing Aves., Brooklyn, N. Y.		
Industrial lacquers	397	140
Hisey-Wolf Machine Co., Cincinnati, Ohio		
Drilling stands for "Hisey" electric drills	38	85
Portable grinder and buffer	81	92
Electric bench and floor stand attachment	97	94
Hobart Brothers Co., Troy, Ohio		
Additional sizes of test benches	302	127
Constant-potential battery charger	347	133
Hoefer Manufacturing Co., Freeport, Ill.		
High-production drilling machines	17	82
Hubar-Jones Corporation, 13 Astor Place, New York, N. Y.		
Godfrey oxygen-jet cutting machine	256	120
Hunter Saw & Machine Co., Pittsburgh, Pa.		
High-speed cut-off saw, No. 1-B	221	115
Husky Wrench Co., Milwaukee, Wis.		
Utility socket wrench set, No. 190	315	129
"Baby" socket wrench set, No. 999	317	129
Hydraulic Press Manufacturing Co., Columbus, Ohio		
"Hi-Speed" hydraulic stamping press	170	106

—— I ——

Ideal Industrial Machinery, Winton Place, Cincinnati, Ohio		
Metal cleaning machine	235	120

—— I ——

(Continued)

	No.	Page
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill.		
High-frequency electric drills	28	83
International Machine Tool Co., Indianapolis, Ind.		
"Libby" Type H heavy-duty turret lathe	124	98

—— J ——

Jacobs Manufacturing Co., Hartford, Conn.		
"Portomatic" drill chuck	35	84
James, D. O., Manufacturing Co., 1114 W. Monroe St., Chicago, Ill.		
Heavy-duty worm gear speed reducer	335	131
Johnson Gas Appliance Co., Cedar Rapids, Iowa		
Direct-jet melting pot, No. 15	402	140
Jones & Lamson Machine Co., Springfield, Vt.		
Model M taper turner	136	100
Chucking outfit for Hartness flat turret	141	101
Universal stage for Hartness comparator	293	126

—— K ——

Kane & Roach, Inc., Syracuse, N. Y.		
Combination roll straightener	230	116
Tube sizing and straightening roll, No. 1	231	116
Kearney & Trecker Corporation, Milwaukee, Wis.		
Milwaukee improved Nos. 2 and 3 milling machines	142	101
"Mil-Waukee-Mil" production-type milling machines	144	101
Keller Mechanical Engineering Corporation, 70 Washington St., Brooklyn, N. Y.		
"Kellocater" jig-boring unit	14	81
Form-turning lathe	134	100
Kelly, R. A., Co., Xenia, Ohio		
Crank shapers, 26- and 32-inch, N.T.	156	104
Kelly Reamer Co., Cleveland, Ohio		
Diamond boring tools	307	128
Kent-Owens Machine Co., Toledo, Ohio		
All-purpose iron and steel worker	180	105
King Machine Tool Co., Cincinnati, Ohio		
Heavy-duty vertical boring and turning machines	1	79
Kingsbury Machine Co., Keene, N. H.		
Semi-automatic nut and screw-head drilling machine	26	83
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.		
Type "N" heavy-duty grinder stand	77	91

— L —

Landis Machine Co.,
Waynesboro, Pa.
Automatic bolt forming and threading machine 195 110
Pipe threading and cutting machine, 16-inch 198 111
Geist 4- and 6-inch heavy-duty pipe cutters 264 121

Landis Tool Co.,
Waynesboro, Pa.
Hydraulic grinder, plain type 5 89
Hydraulic crankpin grinder, 10-inch 90 93

Langelier Manufacturing Co.,
Providence, R. I.
Automatic unit tapping heads .. 188 109

LeBlond, R. K., Machine Tool Co.,
Cincinnati, Ohio
Automatic crankshaft lathe 130 99

Lee Pattern Co.,
130 13th St., Milwaukee, Wis.
Portable electric saw 281 124

Leitz, E., Inc.,
60 East 10th St., New York, N. Y.
Model MS "Metallurscope" with camera 296 126

Lincoln Electric Co.,
Cleveland, Ohio
Automatic carbon-arc welder for range boilers 238 117
Automatic bottom welder for tanks 239 117
Automatic welder for welding heads in range boilers 241 118
Shell-type motor 353 134

Link-Belt Co.,
Chicago, Ill.
Sykes herringbone gear reducer. 336 131
Anti-friction belt conveyor idler 339 131

Logansport Machine Co.,
Logansport, Ind.
"Logan" air control valves 379 137

Long & Allstatter Co.,
Hamilton, Ohio
Power press brake 176 107
Attachment for shear 182 108

Lowe, Harry A.,
1874 East 66th St., Cleveland, Ohio
"Last Word" model F indicator. 288 125

— M —

Machinery Co. of America,
Big Rapids, Mich.
Hanchett locomotive guide bar grinder 91 93

Madison-Kipp Corporation,
Madison, Wis.
Applications of Madison-Kipp oilers 371 136

Mahr Manufacturing Co.,
Minneapolis, Minn.
Automatically-controlled industrial burner 385 138

Manchester Tool Co.,
Manchester, Conn.
"Rapid Cut" taper reamer 311 128

Manville, E. J., Machine Co.,
Waterbury, Conn.
Automatic wire-forming and swaging machine 236 116

Master Electric Co.,
Dayton, Ohio
Motor-grinder 75 91

— M —

(Continued)

McCrosky Tool Corporation,
Meadville, Pa.
Improved "Neva-Stop" faceplate 139 101
"Wizard" friction safety tap holder 199 111

Metalwood Manufacturing Co.,
3362 Wight St., Detroit, Mich.
Reynolds nut driving machine .. 229 116

Micro Machine Co.,
Bettendorf, Iowa
Heavy-duty internal grinder 71 90
Special die grinder 72 90
Valve gear link grinding attachment 105 95

Milburn, Alexander C., Co.,
1416 W. Baltimore St., Baltimore, Md.
Extension paint spray unit 403 141

Millers Falls Co.,
Millers Falls, Mass.
Portable electric drills 30 84

Minster Machine Co.,
Minster, Ohio
Adjustable bed horning press .. 166 105
Double-crank, open-back inclinable presses 171 106

Mitchell Engineering Co.,
Springfield, Ohio
Threading and tapping machines 191 110
Automatic strip buffing machine 206 112

Moline Tool Co.,
Moline, Ill.
"Hole-Hog" No. 115-D driller .. 22 83

Moore Drop Forging Co.,
Springfield, Mass.
"Morco" drop-forged conveyor chain 333 131

Moore, Edward T.,
Syracuse, N. Y.
"Edmoore" power-demand limitator 367 135

Morse Chain Co.,
Ithaca, N. Y.
Improved silent transmission chain 332 131

Morton Manufacturing Co.,
Muskegon Heights, Mich.
Heavy-duty draw-cut shaper, 60-inch stroke 162 105
Combination heavy-duty draw-cut and roll wabble shaper .. 163 105
Special heavy-duty draw-cut shaper 164 105
Portable keyway cutter, 72-inch stroke 262 121

— N —

National Acme Co.,
Cleveland, Ohio
"Namco" chaser grinding fixture 112 96
Gridley 1¼-inch 4-spindle automatic 235 117

National Acme Co., "Positive" Machinery Division,
Cleveland, Ohio
Oil purifier 374 136

National Automatic Tool Co.,
Richmond, Ind.
Natco 4-inch hydraulic-feed drilling unit 24 83

— N —

(Continued)

National Nut & Bolt Co.,
North Easton, Mass.
"Chapnuts" 389 140

Nazel Engineering & Machine Works,
Philadelphia, Pa.
Angle-cutting attachment for traveling head slotter 165 105

Niagara Machine & Tool Works,
637 Northland Ave., Buffalo, N. Y.
Combination bench machine 254 120
Horizontal duplex double seamer. 266 122

Niles Tool Works Co., Division of Niles-Bement-Pond Co.,
Hamilton, Ohio
Boring and turning mill, 20-foot 2 79
Horizontal boring, drilling and milling machine 10 80
Heavy-duty radial drill, No. 25. 20 82
"Time Saver" lathe, 27-inch 115 97
Improved 90-inch locomotive axle journal turning lathe 131 99

Noble & Westbrook Manufacturing Co.,
Hartford, Conn.
Special marking machine 218 114
Rapid production marking machine, No. 25 ..... 219 114
Special marking machine 220 114

Northern Engineering Works,
Detroit, Mich.
Improved series of "Hi-Lift" hoists 271 122

Norton Co.,
Worcester, Mass.
Hydraulic surface grinding machine 59 88
Cylindrical grinding machine, 14-inch, type BA 64 89
Type B full-automatic grinding machine 66 89
Automatic indexing cam grinding attachment 107 95

Norton Co., Bethel-Player Division,
Worcester, Mass.
Lapping head and "Newgrit" abrasive 263 121

— O —

Oesterlein Machine Co.,
Cincinnati, Ohio
Tilted offset miller, 48-inch 147 102

Oilgear Co.,
Milwaukee, Wis.
Type "QS" hydraulic pump 393 139

Oliver Instrument Co.,
Adrian, Mich.
Face mill grinder 84 92

Olsen, Tinius, Testing Machine Co.,
500 N. Twelfth St., Philadelphia, Pa.
Olsen-Lundgren automatic-weighing, tire-balancing machine ... 286 125
Olsen-Lundgren centrifugal dynamic balancing machine 287 125
Automatic impact testing machine 298 126
Olsen-Smith stress-strain recorder 299 127
Haigh alternating-stress testing machine 300 127
Olsen-Honda sharpness tester ... 301 127

Onsrud Machine Works, Inc.,
3900 Palmer St., Chicago, Ill.
Pneumatic hand grinders 80 92

Oster Manufacturing Co.,
Cleveland, Ohio
"Power Boy" pipe threader, No. 414 ..... 197 111

—— P ——

	No.	Page
Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill.		
Touch-up airbrush	375	137
Pels, Henry, & Co., 90 West St., New York, N. Y.		
Type Pr plate frame press, 220-ton	167	105
Pennsylvania Pump & Compressor Co., Easton, Pa.		
Compressors with Texrope drive	376	137
Plews Oiler Co., 405 Boston Block, Minneapolis, Minn.		
Positive-pump oilers	370	136
Pneumatic Drop Hammer Co., 261 Franklin St., Boston, Mass.		
Improved pneumatic-lift drop hammer	214	113
Porter-Cable Machine Co., North Salina & Exchange Sts., Syracuse, N. Y.		
Improved type D-3 horizontal disk grinder	63	89
Pyrene Manufacturing Co., 560 Belmont Ave., Newark, N. J.		
"Phomene Accumutator"	405	141
Pyrometer Instrument Co., 74 Reade St., New York, N. Y.		
Improved "Pyro" optical pyrometer	297	126

—— R ——

	No.	Page
Ransom Manufacturing Co., Oshkosh, Wis.		
Type HS grinding machine	74	91
Reed-Prentice Corporation, Worcester, Mass.		
Geared-head lathe, 14-inch	113	96
Reliance Electric & Engineering Co., 1042-1090 Ivanhoe Rd., Cleveland, Ohio		
Fully-inclosed, ball-bearing induction motors	349	133
Ren Manufacturing Co., Lyceum Bldg., Winchester, Mass.		
"Pull-A-Plug"	368	136
Rhoads, J. E., & Sons, 35 N. Sixth St., Philadelphia, Pa.		
Waterproof leather belts	331	131
Rickert-Shafer Co., Erie, Pa.		
Automatic double-spindle threading machine	190	110
Robinson Machine Co., Muskegon, Mich.		
"Superior" air hose coupling	378	137
Rockwell, W. S., Co., 50 Church St., New York, N. Y.		
Continuous annealing furnace	389	139
Rockwood Manufacturing Co., 1801 English Ave., Indianapolis, Ind.		
"Uni-Pull" belt drive	330	130
Roller-Smith Co., 233 Broadway, New York, N. Y.		
Type COM ohmmeter	365	135
Type HTD circuit tester	366	135

—— R ——
(Continued)

	No.	Page
Rollway Bearing Co., Inc., Syracuse, N. Y.		
Crane hook bearings	381	137
Ross Manufacturing Co., 2196 Clarkwood Rd., Cleveland, Ohio		
Wheel dresser for Landis crankpin grinder	100	95
Ross Operating Valve Co., 6488 Epworth Blvd., Detroit, Mich.		
Pneumatic operating valves	380	137
Rotor Air Tool Co., 5905 Carnegie Ave., Cleveland, Ohio		
High-production air drills	29	84
High-production model D-1 air grinder	79	91
Rowbottom Machine Co., Waterbury, Conn.		
Attachment for cam-cutting machine	252	119
Ryerson, Joseph T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.		
Combination shear, punch and coper	179	107

—— S ——

	No.	Page
Scott-Banabach Machinery Co., 132 S. Clinton St., Chicago, Ill.		
Combination saw outfit, No. 8	224	115
Scully-Jones & Co., 1901 W. Thirteenth St., Chicago, Ill.		
Counterbores and spot facers	308	128
Sebastian Lathe Co., Cincinnati, Ohio		
Precision lathe, 11-inch	117	97
Sellers, William, & Co., Inc., Philadelphia, Pa.		
Horizontal boring, drilling and milling machine with 7-inch spindle	11	80
Type K planer, 36-inch	153	103
Service Machine Co., Elizabeth, N. J.		
"Semco" improved No. P-25½ press and nibbling machine	174	107
Shore Instrument & Manufacturing Co., Van Wyck Ave. & Carll St., Jamaica, N. Y.		
Constant - diameter universal hardness indicator	295	126
Shuster, F. B., Co., New Haven, Conn.		
Automatic wire straightening and cutting machine	251	119
Sichel, L., 200 Fifth Ave., New York, N. Y.		
Precision surface grinder	52	87
Improved way grinding machine	94	94
Sidney Machine Tool Co., Sidney, Ohio		
Improved "Montrol" lathes	118	97
Siewek Tool & Die Co., 10232 Woodward Ave., Detroit, Mich.		
Drill jig	39	85
Simplex Tool Co., Woonsocket, R. I.		
Utility vise	327	130
Skinner Chuck Co., New Britain, Conn.		
"Sturdy-Sectional" stock racks	407	141

—— S ——
(Continued)

	No.	Page
Slocomb, J. T., Co., Providence, R. I.		
Micrometer, No. 45	292	126
Smith & Mills Co., 2889 Spring Grove St., Cincinnati, Ohio		
Back-geared motor-driven shaper, 25-inch	157	104
Back-geared crank shaper, 32-inch	160	104
Snellex Manufacturing Co., Rochester, N. Y.		
Lathe center	137	100
Sossner, A. J. 361 West Broadway, New York, N. Y.		
Combination stamping die	324	130
Southwark Foundry & Machine Co., Philadelphia, Pa.		
Emery-Tatnall 1,000,000-lb. testing machine	303	127
Split Ball Bearing Corporation, Lebanon, N. H.		
Lebanon split ball bearings	329	130
Springfield Machine Tool Co., Springfield, Ohio		
Special 16-inch lathe	127	99
Standard Electrical Tool Co., 1938 W. Eighth St., Cincinnati, Ohio		
Special electric drill, ½-inch	32	84
Portable electric drills	33	84
Twist drill grinding attachment	98	94
Combination buffer and disk grinder	207	112
Standard Machinery Co., Auburn, R. I.		
Automatic drop hammer with roll feed	213	113
Standard 4-high rolling mill	267	122
Traversing reel	406	141
Standard Pressed Steel Co., Jenkintown, Pa.		
All-steel trucks	276	123
Stephens-Adamson Manufacturing Co., Aurora, Ill.		
Type JFS variable-speed transmission	337	131
Stevens, John B., Inc., 27 Cleveland Place, New York, N. Y.		
Duple horizontal drill, No. 00	23	83
Air-operated chucking machine, No. 2½	234	117
Stow Manufacturing Co., Binghamton, N. Y.		
"Lindy" general-purpose flexible-shaft unit	260	121
Stuebing Cowan Co., Cincinnati, Ohio		
"Red Streak" single-side lift truck	278	124
Sullivan Machinery Co., 128 S. Michigan Ave., Chicago, Ill.		
Air compressors of small capacity	377	137
Sundstrand Machine Tool Co., Rockford, Ill.		
Automatic lathe	133	100

—— T ——

	No.	Page
Taylor-Winfield Corporation, 12 Atlantic St., Warren, Ohio		
Automatic sheet welding machine	243	118

—— T ——
(Continued)

No. Page

Teer, Wickwire & Co.,
Jackson, Mich.
Automatic chamfering machine.236 117

Thomson Electric Welding Co.,
Lynn, Mass.
Double-roller seam welder, No. 375 .....244 118
Series No. 180 spot welder,.....245 118
Ring welder, No. 28.....247 119
Model 275 power-driven welder.249 119

Torrington Co.,
Torrington, Conn.
Dayton-Torrington improved 4-die swaging machine.....232 116

Trico Fuse Manufacturing Co.,
Milwaukee, Wis.
"Midget" combination fuse puller and screwdriver 319 129

Triplex Machine Tool Co.,
50 Church St., New York, N. Y.
"Mikron" No. 79 bench gear hobbing machine..... 40 85

Trundle Engineering Co.,
118 St. Clair Ave. East, Cleveland, Ohio
Johnson jig spacer..... 15 81

Tuthill, Pump Co.,
131 West 63rd St., Chicago, Ill.
Reversible coolant pump.....386 138

—— U ——

U. S. Tool Co.,
Ampere, N. J.
Steel sub-presses.....325 130

Union Tool Co.,
Orange, Mass.
Combination square, No. 600-B..323 130

—— U ——
(Continued)

No. Page

Unishear Co.,
270 Lafayette St., New York,
"Mighty Midget" unishear.....184 108

Universal Boring Machine Co.,
Hudson, Mass.
Heavy-duty model No. 24 "Tri-Way" boring machine..... 7 80

—— V ——

V. & O. Press Co.,
Hudson, N. Y.
King pressure toggle.....409 141

Van Keuren Co.,
12 Copeland St., Watertown, Boston 72 Mass.
Set M-81 gage blocks.....294 126

Van Norman Machine Tool Co.,
Springfield, Mass.
Oscillating grinding machine, No. 42..... 92 93

—— W ——

Walker, O. S., Co.,
Worcester, Mass.
Improved magnetic chucks..... 95 94

Walls Sales Corporation,
96 Warren St., New York, N. Y.
Duplex-M abrasive band and disk grinder 209 113
Simplex-B-M abrasive band grinder 210 113

Waltham Machine Works,
Waltham, Mass.
Thread milling machine.....193 110

Warner & Swasey Co.,
Cleveland, Ohio
Turret lathe, No. 3-A, with 3¼-inch bar capacity.....125 98

—— W ——
(Continued)

No. Page

Waterbury-Farrel Foundry & Machine Co.,
Waterbury, Conn.
Four-post blanking press.....168 106
Automatic combination pointer and threader.....194 110
Automatic bolt head trimmer...268 122

Westinghouse Electric & Manufacturing Co.,
East Pittsburgh, Pa.
Automatic-arc seam welder.....240 117
Single-operator arc-welder.....341 132
"Linestart" motor with "Linestarter" 346 133
Dust-tight and oil-immersed "Linestarters" 359 134
Time-delay device for low-voltage release 360 134

Whiting Corporation,
Harvey, Ill.
Tumbling mill 269 122

Whitney Metal Tool Co.,
Rockford, Ill.
Angle iron shear, No. 62.....183 108
Heavy-duty ratchet brace.....321 129

Wickes Boiler Co.,
Saginaw, Mich.
Forming press for boiler shells..177 107

Wickes Brothers,
Saginaw, Mich.
Semi-automatic crankshaft lathe, 34-inch 129 99

Williams, J. H., & Co.,
Buffalo, N. Y.
"Obstruction Superrench" 316 129

—— Y ——

Yarnall-Waring Co.,
Philadelphia, Pa.
"Yarway" automatic two-pressure hydraulic valve control.....408 141

CONTENTS OF THE REVIEW PAGES

European Edition

	No.	Page
Boring Machines	1-4	149
Horizontal	1-2	149
Vertical	3	149
Special	4	149
Drilling Machines	5-20	149
Sensitive	5	149
Horizontal	6	149
Multiple-spindle	7-8	150
Radial	9-11	150
Slot	12-13	150
Special-purpose	14-16	151
Attachments	17-20	151
Grinding Machines	21-26	152
Centerless	21	152
Surface	22	152
Tool and cutter	23-24	152
Portable	25	153
Special	26	153
Lathes	27-33	153
Engine	27-29	153
Special	30-33	153
Milling Machines	34-38	154
Vertical	34-35	154
Cam	36	154
Attachments	37-38	154
Planers and Shapers	39-41	155
Planers	39-40	155
Shaper	41	155
Other Machines	42-57	155
Engraving	42	155
Gear	43-44	155
Oxygen-cutting	45-47	156
Presses	48-50	156
Sawing	51-52	156
Screw machines	53-54	157
Threading	55-56	157
Turning	57	157
Balancing, Gaging and Testing Equipment	58-61	158
Balancing machine	58	158
Gages	59-60	158
Testing machines	61	158
Miscellaneous Equipment	62-72	158
Transmission	62-65	158
Vises	66-67	159
General	68-72	159

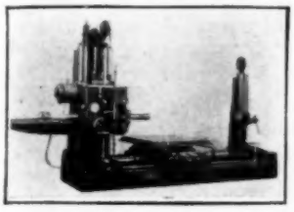
Boring Machines

— 1 —

Boring Machine, Horizontal, with Flange Motor

Selson Engineering Co., Ltd., Charles St., London, E. C., England. [Vol.66,p.261E]

This machine is driven by a d.c. or a.c. two-speed motor flanged direct to the spindle head. Six changes of automatic feed in both directions, increased to eighteen by the use of change gears, are provided for the spindle head, the spindle



itself, and the table. All feeds have adjustable stops. A range of sixteen spindle speeds is regularly furnished, and the range may be doubled by motor regulation. Rapid power traverse, independent of the spindle speeds, is provided for the return of all automatic feeds.

Graduated scales are fitted for the vertical movement of the saddle, the horizontal feed of the spindle, and the rotary and sliding movements of the table.

The diameter of the spindle is 3½ in., and it has a No. 5 Morse taper hole. The working surface of the rotary table is 39x47 in., and the maximum height of the spindle over the table is 39¾ inches.

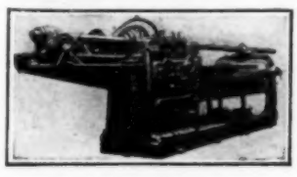
The driving motor is rated at 4½ hp. The net weight of the machine, including the motor and starting equipment, is 7½ tons.

— 2 —

Boring Machine, Horizontal, Large-Size

J. Buckton & Co., Ltd., Leeds, England. [Vol.66,p.277E]

The boring machine has an all-gear headstock with single pulley drive, and can bore work up to 8 ft. 6 in. long and face flanges up to 3 ft. in diam. The work table is adjustable, verti-



cally and transversely. A longitudinal adjustment is also provided, so that work may be set at the desired distance from the headstock. The headstock has eighteen spindle speeds, ranging from 2.2 to 71 rev. per minute.

The gantry may be raised and lowered 2½ ft., allowing a maximum distance of 3 ft. from the spindle center to the table top. The gantry carries a compound table 4x5 ft., with 5 ft. transverse and 6 ft. longitudinal traverse. The machine admits a maximum length of 10 ft. between the boring stay and the spindle socket. The spindle has a 5 ft., self-acting geared feed traverse motion, and 10 ft. traverse with second grip. Eight feed changes and reverse are supplied.

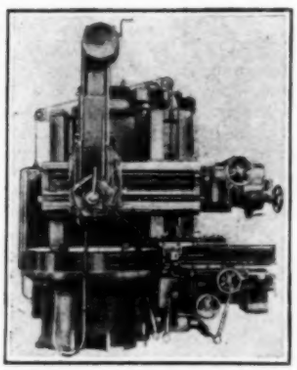
Horsepower required, 12; overall floor space, 30 ft. 3 in. x 10 ft. 8 in.; height, 8 ft.; weight, 22 tons.

— 3 —

Boring Mill, Vertical, With Turret and Side Head

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.67,p.190E]

The vertical boring and turning mill with turret and side head is made in four sizes from 30 to 48 in. The largest size is shown. It swings work 53 in. in diam. with the side head in use, or 55 in. with the side head



down. The height admitted under the cross rail is 39 in. and under the turret face 49 inches.

Drive is by a 15-hp. motor which is placed on a bracket at the rear of the upright. Arrangements may also be made for chain drive. By means of a gear box, eight table speeds can be obtained, ranging from 3 to 40 rev. per minute.

The machine is of a single upright type, carrying a cross rail having vertical adjustment, and bearing a saddle with a swivel slide, and a ram carrying a five-sided turret. The side head is fitted to a slide on the upright and carries a horizontal ram and a four-sided tool post.

Feed changes are obtained from two boxes, one mounted on a cross rail and the other on a side head. Rules and micrometer dials are fitted for both rams.

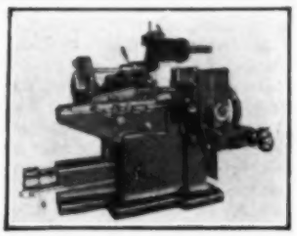
Excluding the electrical equipment, the weight of the machine is about 11 tons.

— 4 —

Boring and Grinding Machine, Cylinder

L. Kellenberger & Co., St. Gall, Switzerland. [Vol.66,p.293E]

The machine shown has two spindles which are used alternately, one to bore and ream the cylinder and the other to grind it to size. The illustration shows the grinding spindle in operation and the boring spindle swung out of way on the top.



The cylinder block is first rough bored and then set up in the machine and the bore centered with a special plug. The boring head is then swung down into operating position and the whole brought to within 0.002 in. of size. The grinding spindle is then brought into play. It is claimed that a bore 2¾ in. in diameter and 8 in. long can be ground to the necessary limits in 7 or 8 minutes.

The machine is suitable for bores from 2 7/16 to 3¾ in. in diam. and up to 8¾ in. long, but is not recommended for cylinders with steel bushings. The table has a surface of 53x17¾ in. and a cross traverse of 40 in. The weight is 4,500 pounds.

Drilling Machines

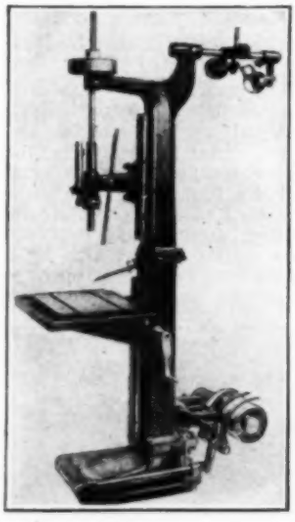
— 5 —

Drill, Sensitive, 16-Inch

Jones & Shipman, Ltd., Leicester, England. [Vol.66,p.258E]

Increased power is claimed for this machine, the driving pulleys having been made larger and the belt drive lengthened. The spindle pulley is 7½ in. in diameter and the largest cone is 8 inches.

Special attention has been given to the coolant supply, the arrangement being inclosed in the column and base of the machine. The lubricant is supplied to the drill point by metallic



hose. A channel surrounding the table conducts the coolant direct to the tank through a slot in the column. No tubing or piping is used.

The table is 20x18 in. overall. It is raised and lowered by a ratchet lever operating through a rack and pinion.

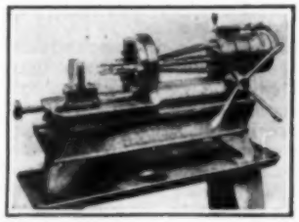
The machine drills holes in steel up to 1 in. in diam. It can be built in multiple-spindle types up to six spindles.

— 6 —

Drill, Horizontal, Six-Spindle

John Ackworthie, Ltd., Coleshill St., Birmingham, England. [Vol.67,p.151E]

The machine shown carries up to six spindles, and will drill holes up to ¾ in. in diam. in steel. The spindles are driven



from a central gear which is itself driven direct from the pulley shaft. The gearing is covered by a plate to retain the grease.

The spindles have a range of movement from 6½ in. maximum and can be brought t within

¾ in. of each other. The pressure of drilling is taken by ball thrust bearings.

The table is moved towards the drills by means of a rack and pinion. This table is fastened to a base mounted on a slide. Jigs, or angle plates, can be attached to the table or the table can be removed and the fixtures screwed directly to the base.

The machine is intended for bench use.

— 7 —

Drilling Machine, Vertical, Multiple-Spindle

S. Wolf & Co., Ltd., Southwark St., London, S. E., England. [Vol.67,p.48E]

The drilling machine has been designed so that the operator may be seated at work while he feeds the parts to be drilled upwards by means of a foot lever. The work table, having a surface

of 12½x7½ in., is guided by a long spindle in an adjustbale bracket. The lift of the table is 2¾ inch.

The machine is available in two patterns, one having thirteen drilling spindles running at 1,900 r.p.m., the other ten spindles, one of which can be arranged to run at 1,900 and the other at 1,250 r.p.m. A second gear head can be supplied so that the 10-spindle machine can be converted into a 13-spindle machine.

The lower end of each spindle is carried by a bracket secured to either a circular or a rectangular frame, the two forms being interchangeable. The ordinary circular frame will cover a circle of about 5¾ in., while a larger frame can be supplied to cover a circle 7¼ in. in diam. The rectangular frame will cover an area about 5x10 inches.

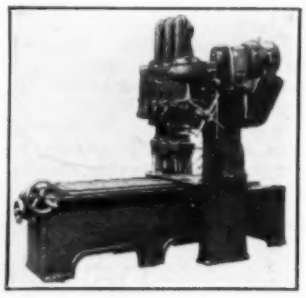
The spindles are available in five different sizes, the smallest having a drilling capacity of ¼ in. in mild steel and minimum centers of ⅞ in., while the larger spindles will drill up to ¼ in. at ¾ in. minimum centers.

— 8 —

Drill, Multiple-Spindle, Vertical

White Machine Tool Co., Ltd., Halifax, England. [Vol. 67,p.122E]

The machine illustrated was designed for drilling and tapping a large number of holes simultaneously in cold-rolled steel plates of various sizes. The bed is of planer type with V guides and the table is traversed by hand along the bed by means of a handwheel geared by spirals to a horizontal screw. A micrometer dial is attached to



the end of the screw in a convenient position.

The drive is by a 5-hp. constant-speed motor, coupled direct to the gear box input shaft, which provides two spindle speeds for drilling and tapping. The reverse motion for tapping is obtained by a cluster of miter gears and a dog clutch operated by a handle. Each spindle can be independently adjusted for height. When the drills break through the plate, a dog fixed to the friction clutch throws the feed out of gear.

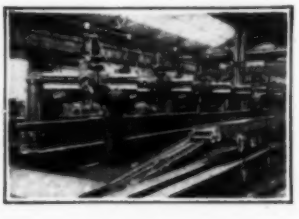
Floor space, 15 ft. x 5 ft.; height, 7 ft. 9 in.; weight, 3 tons, approximately.

— 9 —

Drill, Radial, Girder, 6-Foot

Kitchen & Wade, Halifax, England. [Vol.67,p.23E]

The main features of the machine include the vertical motor mounted on the saddle and geared direct to the spindle; the all-ball-bearing drive; one speed and one feed giving a penetration of 3 to 4 in. per min., according to the duty; combined lock to saddle and arm by a single lever movement operated from the saddle; means for



swinging the arm by the pressure of a single finger; and saddle traverse along the arm on ball-bearing rollers. The arm, which has a maximum radius of 6 ft. and a minimum one of 15 in., also rotates on ball bearings.

The spindle end is bored to a No. 4 Morse taper. The machine is capable of drilling holes up to 1¼ in. in diam. in solid steel. Work up to 4 ft. 1 in. can be admitted between the floor line and the underside of the spindle nose. The machine is for particular use in drilling structural shapes.

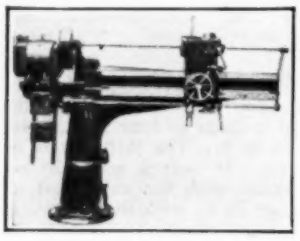
Weight, 4,500 pounds.

— 10 —

Drill, Radial, Girder, 6-Foot

Scott Bros. (Halifax), Ltd., Halifax, England. [Vol.67,p. 41E]

The machine illustrated is self-contained and is specially adapted for heavy-duty drilling on steel plates and structural steel parts. It admits work up to a maximum height of 4 ft. under the spindle nose. The radial arm revolves on the pillar on ball thrust bearings, while roller bearings take the side weight of the arm and make it



easy to manipulate. The arm can be locked to the pillar by means of a lever located on the saddle.

The saddle is a one-piece casting embodying the driving and feeding mechanism. Two rates of drilling feed are provided, of 78 and 128 rev. per in. of traverse.

The spindle has a vertical feed of 12 in. It has a quick withdrawal motion and is balanced by a spring incased in the cover plate. The drive is by means of a 6-hp. variable-speed motor. The machine is capable of drilling holes upwards to 1½ in. in diam. at a speed of 2½ in. per minute.

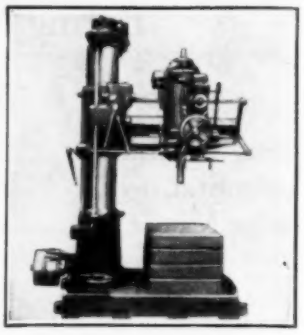
Weight, including motor, 4,700 pounds.

— 11 —

Drill, Radial, 4-Foot

Midgley & Sutcliffe, Bradford, England. [Vol.67,p.86E]

The 4-ft. radial illustrated is intended to be the first of a new standard line. The chief claim made for it is that the controls



have been centralized and are within easy reach of the operator in his working position.

The drive is through a 4-speed box in the arm by a back shaft to the saddle and the spindle through double gearing. The eight spindle speeds obtained range from 30 to 500 rev. per minute.

A central pillar carries an outer sleeve, rotating at the lower end on ball bearings. The saddle moves along the arm on roller bearings, and a ball thrust bearing is provided for the spindle. By means of a single lever, the saddle is locked on the arm, and the outer column on its bearing.

The arm rises and falls on the column 2 ft. 6 in., the maximum distance from the base to the spindle nose being 4 ft. The saddle is a self-contained unit and carries a spindle 2¼ in. in diam. balanced by a coil spring.

The three rates of geared feeds are obtained through a gear box on the saddle. In addition, sensitive hand feed is available.

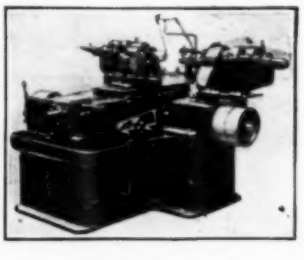
The table is 24 in. square by 20 in. deep.

— 12 —

Drill, Slot, Duplex-Spindle, Horizontal

Carter & Wright, Halifax, England. [Vol.67,p.136E]

This machine cuts keyways on each side of a shaft simultaneously, up to 1¼ in. wide by 24 in. long, or cotter holes up to 12 in. long by 1¼ in. wide by 7 in. deep in shafts, piston rods and the like. The drilling heads are made right and left hand and receive motion from the main driving shaft by means of silent chains. The maximum distance between the spindle noses is 15 in. and the minimum



4 in., while the height of the spindles above the top of the table is 7 inches.

A gear box provides three spindle speeds of 349, 400 and 693 r.p.m. The feeds of the spindle per traverse are 0.005 to 0.05 in. The feed motion is obtained by means of a square thread screw connected to each spindle by a rod and rotated by a ratchet pawl connected to a rocking lever. The latter is operated by cams, one on each side of the table.

The working surface of the table is 48x12 in. The table has three changes of traverse ranging from 2.6 to 36 in. per min. The drive is by a 5-hp. motor.

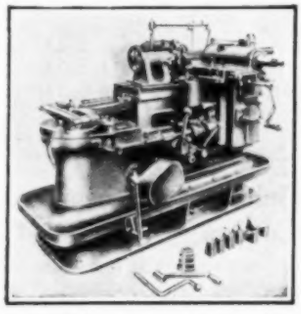
Floor space, 6 ft. 6 in. x 5 ft.; weight, 3,400 lb. net.

— 13 —

Drilling Machine, Slot, Horizontal Duplex

G. Richards & Co., Ltd., Broadheath, near Manchester, England. [Vol.67,p.177E]

This slot drilling and mortising machine is available in two sizes, the smaller to cut keyways or slots up to ¾ in. wide by 6 in. long through 3-in. shafts and the larger to cut keyways



up to 1¼ in. by 12 in. long through 7-in. shafts. By means of a special attachment, the ends of through slots can be tapered.

A reciprocating table carries a self-centering device for holding the work at one end, the other end being supported in a loose headstock. The length of the cut is controlled by a slotted crank disk.

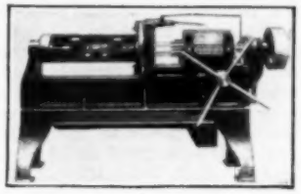
In the small machine, the four spindle speeds range from 415 to 1,800 r.p.m. The larger machine has sixteen speeds ranging from 73 to 701 r.p.m. Automatic feed is applied to each end of the table traverse.

— 14 —

Drill Horizontal, for Crankshafts, Eight-Spindle

Kitchen & Wade, Halifax, England. [Vol.66,p.258E]

The drilling head is driven by a single pulley from a countershaft, and the motion is transmitted to the six drilling and two reaming spindles by heat-treated nickel-steel gears, fully inclosed and running in grease or thick oil. The sensitive feed to the spindles is operated by a large cross handle, through miters, screw and nut.



Six holes, approximately ½ in. in diam., are drilled in the crank. Simultaneously two holes are drilled in the rear crank, then by means of a spring plunger the loading fixture is released and revolved half a turn. The finished crank may then be removed.

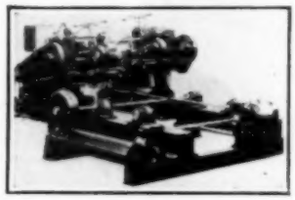
Floor space, 7 ft. x 2 ft. 9 in.; approximate weight, 2,600 pounds.

— 15 —

Drilling and Countersinking Machine for Locomotive Wheel Tires

W. Asquith, Ltd., Halifax, England. [Vol.67,p.73E]

Motor-driven duplex and single-head horizontal machines have recently been constructed for drilling and countersinking locomotive wheel tires for the purpose of securing them to the wheels. The double-headed unit takes locomotive wheels of 2 ft. 3 in. to 7 ft. in diam. of



the standard British gage of 4 ft. 8½ inches.

Mounted on their axles, the wheels and tires rest on four runners, two of which are knurled to enable the wheels to be rotated by a 2-hp. motor. The wheels are locked in position between two serrated jaws.

The drilling heads are right and left handed. The head is carried on a column with square guide ways and has vertical hand adjustment of 4½ in. A combined drill and countersinking tool in the main spindle produces the rivet hole at one end and a separate countersinking head is provided for the opposite end of the hole.

The drilling spindles have variable speeds from 125 to 270 r.p.m. and have a travel of 8 in. Each head is separately driven by a 3-hp. variable-speed motor. One feed only is provided.

The approximate weight of this machine is 3 tons, and the floor space occupied, 11 ft. 6 in. x 9 feet.

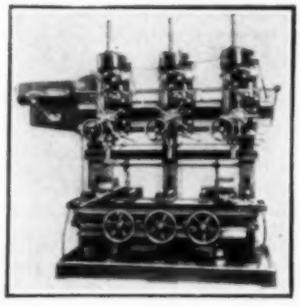
The single-head machine is the same as the double-head machine in main details, but one of the cross rails is adjustable by power to enable locomotive wheels of any gage between 2 ft. 6 in. and 5 ft. 6 in. in diam. to be accommodated. The approximate weight of this machine is 4,800 pounds.

— 16 —

Drilling and Trepanning Machine, Three-Spindle

F. Town & Sons, Halifax, England. [Vol.67,p.165E]

The three-spindle machine illustrated is for drilling, tapping, and oval-trepanning three holes simultaneously in the square tubes of water-tube boilers. It will drill three 2-in. holes at the



same time from solid steel plates and will trepan oval holes with major and minor axes of 4¾ and 4 in., respectively. A T-slotted rail underneath the cross-slide carries the steady rests used when the tripanning tools are in operation.

Three box-section standards carry the cross slide on which each drilling head is adjustable independently by handwheel. The maximum center distance between the two outside spindles is 6 ft. and the minimum centers of adjacent spindles is 21 in. The machine is driven by a 15-hp. motor through a 4-speed gear box.

Each spindle has a vertical traverse of 15 in. either by hand or power, with automatic trip. Eight speeds are provided, ranging from 20 to 277 r.p.m., while the six feeds range 590 to 90 cuts per inch.

The work table measures 81x19 in., and has a longitudinal traverse of 24 in., and a cross traverse of 6 in. It can be elevated 18 in. The table carries two vises and six rollers to facilitate the handling of the tubes.

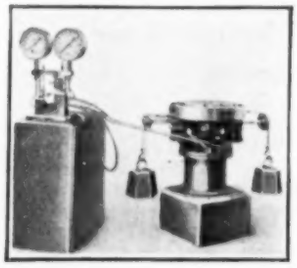
Floor space, 12 ft. by 4 ft. 4 in.; height, 9 ft. 2 in.; weight, without motor, 7½ tons.

— 17 —

Drill Testing Apparatus

T. C. Howden & Co., Fleet St., Birmingham, England. [Vol.66,p.219E]

This drill testing apparatus made by Alfred J. Amsler & Co., Schaffhouse, Switzerland, and marketed in England under the above company, is intended for measuring the vertical force and the torsional moment ex-



erted by a drill when a hole is being cut. It consists of two parts, the drill table and the load indicator.

The drill table is placed on the drilling machine and carries the test piece to be drilled, while the load indicator carries two gages, one for indicating the vertical force, the other the torsional moment exerted.

The table on which the test piece is fixed rests on a plunger piston which moves in a vertical cylinder filled with oil. The table is free to rotate around the vertical axis and two horizontal cylinders filled with oil and connected with a gage register the torsional moment.

Two spring dynamometers record the oil pressures on a diagram, both values of drilling force and torsional moment being on one ordinate.

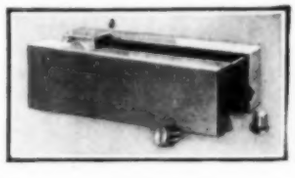
— 18 —

Drilling Jig for Round Stock

Atalanta, Ltd., 1-3 Brixton Rd., London, S. W. England. [Vol.67,p.49E]

The main purpose of this small drilling jig is to enable holes to be drilled diametrically through round bars, spindles, etc., from ¼ to ¾ in. in diam. It consists of two rectangular pieces made of mild steel about 2¾ in. long by 1x¾ in., each of which is V-grooved in the manner indicated.

The sides are kept in correct alignment by means of steel pins. In use a button, having



the same diameter as the work to be held, is centered for drilling and is placed in the vertical Vs at the left. The hole of the required diameter is drilled in it so that it acts as a guide.

The work is then placed in the horizontal Vs and the whole piece is locked by the vice on the drilling table. A set of ready-centered turned buttons from ¼ in. to ½ in. outside diameter is available.

— 19 —

Drill Heads, Multiple-Spindle, Special

Jigs, Ltd., 15, Great James St., London, W. C., England. [Vol.67,p.136E]

The two fixed-type multiple-drill heads are for use in drilling automobile cylinders and cylinder heads. The illustration shows a three-spindle head, capable of driving drills up to ⅞ in. in diam. The unit is also made in an eight-spindle head

of similar design. Seven of the spindles are set close in line, the eighth being somewhat offset.

A particular feature is the positive end adjustment for the spindles, which prevents loosening under drilling conditions. Compactness is another advantage.

The work is automatically located and held by a spring jig plate supported by two pillars which are fixed in bosses in the body of the jig. No locating collars are necessary, as the vertical travel for drilling is controlled by splines in each pillar engaging with patent screws in the jig plate.

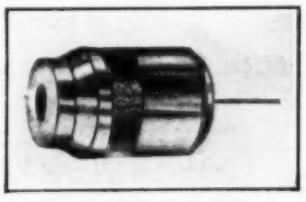
To allow short center distances, the main drive is located above the subsidiary spindle drives, and transmission is effected through a double-offset intermediate gear.

— 20 —

Drill Chuck, Automatic

Selson Engineering Co., Ltd., Charles St., Hatton Garden, London, E. C., England. [Vol. 67,p.150E]

A particular feature of this drill chuck is the small number of parts, these consisting principally of the body, outer ring, three jaws, a front cover plate, and a flat coil spring. The



drills can be changed while the machine is in motion. The jaws tighten their grip as soon as the resistance increases and hence the drills are automatically centered. The chuck is made in six sizes, the smallest taking 1/16- to 5/32-in. drills and the largest 13/32- to 1-in. drills.

All parts are made interchangeable so that replacement is a simple matter.

Grinding Machines

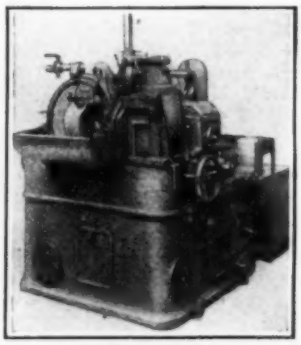
— 21 —

Grinders, Centerless

B.S.A. Tools, Ltd., Sparkbrook, Birmingham, England. [Vol.67,p.130E]

The two new sizes of centerless grinders, Nos. 10 and 5, have capacities respectively of work ¼ to 5½ in. in diam. and ⅛ to 3 in. in diam. Both are suitable for plain, taper and shouldered work. The No. 10 machine is shown in the illustration.

The spindles on both the grinding and the control wheels are horizontal and the work-supporting plate is inclined. The



speed of the work is regulated by a control wheel and by the relation of the angularly-disposed, work-supporting plate to the peripheries of the grinding and control wheels.

The grinding wheel is 20 in. in diam. maximum and 13 in. minimum by 4 in. wide. The control wheel head is bolted to the upper bed and the wheel itself varies from 9 to 12 in. in diam., while its width is the same as the grinding wheel.

A gear box provides eight control-wheel speeds ranging from 21 to 62 rev. per minute.

The No. 10 machine occupies a floor space of 7x6 ft. and weighs 5,500 lb., while the No. 5 machine occupies a floor space of 6 ft. 6 in. by 5 ft. and has a net weight of 3,400 pounds.

— 22 —

Grinder, Surface and Die, Electrically-Driven

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.123E]

Usually this machine is driven by fast and loose pulleys carried on a countershaft behind the column, but an electric motor carried on a bracket bolted to the side of the column and driven by means of a wide pulley direct to the wheel spindle may be employed. The machine

table is 18x5 in. and has both a longitudinal travel and a vertical adjustment of 10 in. The maximum distance from the table to the underside of a 6-in. grinding wheel is 9 in. The transverse adjustment of the wheel is 3⅜ inch.

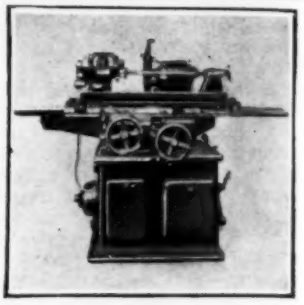
The wheel spindle runs on ball bearings and carries a 6¾-in. wheel and a forged steel guard. A vertical slide on the column guides the knee.

— 23 —

Grinder, Universal Tool and Cutter

Fritz Wunderli, Uster, Switzerland. [Vol.67,p.100E]

This tool and cutter grinder has a maximum swing of 6 in.



and a maximum distance between centers of 25½ inch.

The cross-feed of the table is 7¾ in. and the vertical adjustment of the grinding wheel head is 10½ in. The speeds to the grinding wheel spindles are 2,600 and 3,900 r.p.m., and the three work speeds range from 240 to 360 r.p.m. The three table speeds range from 18½ to 38 in. per min. The machine can be arranged for drive by belt or by a self-contained 2½-hp. motor.

The unit is built up on a rigid square body casting and incloses all the mechanism for driving the grinding spindle, the table feeds, and the pump, in such a way that no gears or belts are outside the machine. The top table which supports the work can be swiveled on the lower table to 90 deg. and the angle read on a scale. This construction makes the machine universal so that it can be used for work of every kind, but especially for tool grinding purposes.

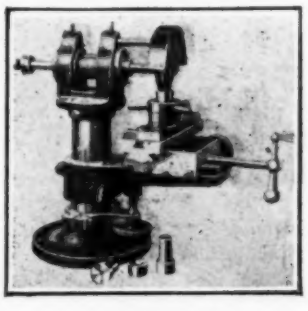
— 24 —

Grinder for Circular Cutters

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.66,p. 274E]

The small cutter grinder was especially designed for grinding the A. W. circular cutters both of the shank and button type. The cutter head is fixed to the top of the column and the spindle carries a grinding wheel at each end. The spindle is mounted on ball bearings.

The table movements are similar to those employed in the ordinary horizontal mill. The knee has vertical adjustment on the column and can also be swiveled. The bottom slide has V bearings on the knee with



movement to and from the column, operated through a rack and pinion. The longitudinal movement of the table is similarly operated.

The circular cutters are ground by mounting them in the fixture shown and rotating by hand. The wheel used is 3½ in. in diam. and the table has a maximum adjustment of 3 in. parallel to the spindle. The table has a maximum movement in the other direction of 9 in. and a vertical adjustment of 3 inches.

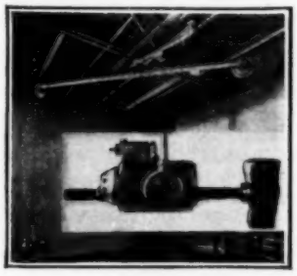
Floor space, 24x18 in.; overall height, 17 in.

— 25 —

Grinder, Electric, Suspended

Vidal Engineering Co., Thornton Road, Croydon, England. [Vol.66,p.208E]

The motor-driven spindle for use in polishing and grinding has a motor suspended from a double-jointed overhead swinging mechanism which allows the grinding spindle to be moved



into any position within a horizontal circle of 24 ft. in diam. The vertical travel is 6 feet.

The motor is completely balanced by the suspension and can itself be swiveled in a horizontal and vertical plane so that the movement is universal.

The suspension cable passes from the motor over a guide pulley at one end of the arm, then to a fusee device at the other end and thus to the spring, the purpose being to maintain uniform tension to balance the motor in any position within the vertical range. The motor is rated at 1½ hp. and is of the enclosed type with a geared spindle off-set to give extra clearance around the body.

Ball bearings are fitted throughout.

— 26 —

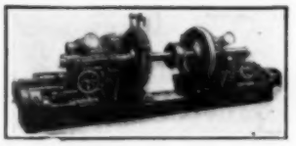
Re-Grinding Machine, Axle-Journal, Double-Ended

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester, England. [Vol.66,p.210E]

The unit shown is a double-ended machine for grinding railway axle journals. The outstanding feature is the drive by means of a link belt carrying hard rubber blocks that run on the tire of a wheel carried by the axle itself.

The design of the machine is similar to that of the firm's single-ended axle grinder. The operation is practically the same, but the grinding wheel head-stock is necessarily duplicated. Each wheelhead is driven by a 15-hp. motor. One motor also drives the work.

The grinding wheel slide has a maximum traverse of 18 in., for which a 4-speed gear box is provided. The slide is 5 ft.



3 in. long and is carried in double V-ways. The cross-feed can be operated by hand and quick motion is available for moving the wheel to and from the work. Automatic feed is provided at each traverse of the wheel and an automatic trip acts when the desired diameter has been reached.

Lathes

— 27 —

Lathe, Center, 15-Inch, Improved

C. Redman & Sons, Ltd., Halifax, England. [Vol.66,p.289E]

This company has been remodeling its standard lathes, both cone pulley and all-geared types, ranging from 7 to 15 in. capacity. The 15-in., cone-driven, general-purpose center lathe is illustrated.

This lathe admits work 9 ft. 1 in. long between centers and 30 in. in diam. over the bed, 22½ in. over the saddle, and 53 in. in diam. by 20 in. wide in the gap.

The bed, which is 16 ft. long by 24 in. across the shears, is of box section, well ribbed, and comes down to the floor.

The steel spindle is ground and runs in gunmetal bearings. It has a 4½ in. hole clear through. Thrust is taken on ball bearings.

With the two-speed countershaft, sixteen spindle speeds are available ranging from 4 to 606 r.p.m. The loose headstock has a cross adjustment for taper turning. A three-speed gearbox for feeds is located under the driving headstock, while the apron is of the double wall type.

Floor space, 19 ft. 4 in. x 5 ft. 4 in. wide. Weight, 6¼ tons.

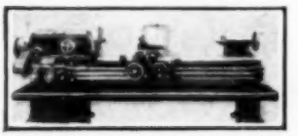
— 28 —

Lathe, 8-Inch, Braun

United Machine Tool Co., Ltd., Gray's Inn Road, London, W.C., England. [Vol.67,p.58E]

The Braun lathe of the type here illustrated swings work 10½ in. in diam. over the saddle, and the bed is provided in a number of lengths to take work up to 9 ft. 10 in. between centers. At the front is a wide inverted V to take the pressure of the saddle while at the back is an inverted V for guiding the tailstock.

The headstock provides twelve spindle speeds ranging from 12



to 380 r.p.m., obtained through sliding gears controlled by a lever and a handwheel.

The machines can be had with either a feed box or quick-change gear box, the former driving a feedshaft and providing six feeds.

When the quick-change gear box is fitted, both the leadscrew and feedshaft are driven from it, the motions being interlocked. This box provides for the cutting of 36 Whitworth and 36 metric threads.

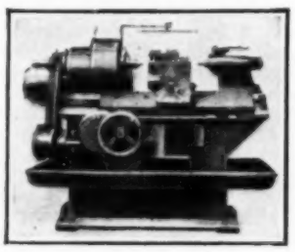
— 29 —

Lathe, Maxicut, Improved

Drummond Bros., Ltd., Guildford, England. [Vol.67,p.83E]

The Maxicut lathe in its latest form will take work 9 in. diam. by 18 in. between centers, the maximum length of work turned being 16 in. and the maximum travel of the facing slide 4 inches.

The top of the bed is of V-form, the front inclined surface guiding a slide carrying tools



employed for ordinary turning operations, while the back surface supports a slide used for facing and forming. The head- and tail-stocks are borne by the back surface; consequently the front carriage can be extended to almost the full length of the bed.

The head-stock may be of two types, the standard form being driven by a constant-speed pulley. For high-speed work, such as the turning of aluminum pistons, a single-speed headstock without gearing may be provided.

The bed is of pentagonal cross-section, the slides having long narrow dovetailed guiding shears with taper gibs to prevent any tendency to lift.

— 30 —

Lathe, Combination, 60-Inch

Ward, Haggas & Smith, Keighley, England. [Vol.66,p.305E]

The 60-in. combination surfacing and boring lathe admits work 5 ft. long between the chuck and hexagon turret slide, 60 in. diam. over the bed, and 50 in. over the front saddle. The box-section bed is 13 ft. long by 32½ in. wide by 24 in. deep.

The headstock carries a four-speed cone. The gears in the head give twelve spindle speeds

arranged in geometrical progression. The hollow steel spindle is 18 in. diam. by 19½ in. long, and has a hole 14 in. diam. at the front end and 4 in. at the back. It carries a 55-in. four-jaw chuck. End thrust is taken on a ball bearing

There are three rates of positive feeds and reverse to the saddle, controlled from the gearbox under the driving head.

The slide on the right carries a hexagon turret, and has three drilling and boring feeds, controlled from the gearbox at the left.

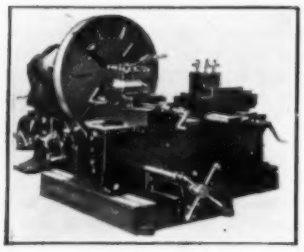
Floor space, 16 ft. by 7 ft. 8 in.; weight, 11½ tons.

— 31 —

Lathe, Wheel-Turning and Boring

G. Swift & Sons, Ltd., Halifax, England. [Vol.67,p.15E]

The lathe for turning and boring the wheels employed on motor road vehicles has a capacity for work up to 4 ft.



6 in. in diam. by 24 in. wide. The drive is by a four-speed cone and double gearing. The headstock is mounted on a box-section stand, to which are bolted two foundation plates for carrying the two adjustable slides on short beds placed at right angles to each other. The rear slide is for turning the wheel rims and has power traverse motion longitudinally and hand traverse in the transverse direction.

The front slide is of similar construction but has a four-way turret tool post, and power motions in both directions

The six feeds range from 10 to 52 cuts per in. of traverse and are controlled from the feed and reverse gearboxes in front of the headstock.

Floor space, 9 ft. 6 in. x 8 ft. 3 in.; weight, 1,500 lb. net.

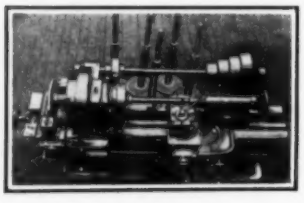
— 32 —

Lathe, Buffer-Turning

Dean, Smith & Grace, Ltd., Keighley, England. [Vol.67,p. 150E]

The special lathe shown is for turning railway buffers on a mass-production basis. The view shows the three cutting tools in their working position.

The driving headstock has a steel spindle with a 3¾-in. hole



clear through and runs in bronze bearings with a ball thrust bearing.

At one end the buffer is carried in a 3-jawed chuck and the other is supported on a steady rest, while the outer end of the buffer stem bears on the center of the loose headstock. The driving cone has four steps and with a 2-speed countershaft gives eight spindle speeds varying from 12 to 114 r.p.m. A small saddle on the left of the headstock is used for turning the buffer disk. The front tool post carries a form tool for turning the round edges of the disks.

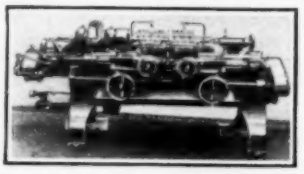
Four feeds are provided. The machine occupies a floor space of 8 ft. 1 in. x 3 ft. 9 inches.

— 33 —

Lathe, Axle Shaft, Improved

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.67,p.177E]

The lathe swings work 12 in. in diam. over the bed. The normal distance between centers is 30 in. The machine can be arranged for finishing camshafts, in which case the head is arranged to drive from one end instead of the center. A roller bearing is provided in the center to support the camshaft while it is being turned. The machine has a central drive and the tools are grouped so that the



operation is completed in the time needed for the longest single cut.

In the front tool blocks, the tools are arranged to break up and rough turn the spaces between the cams. The back tools cut down the sides of the cams and finish the shaft. The method of operating the back cross traverse is by means of a drop worm, which is tripped out as soon as the tools have fed in the necessary depth.

Milling Machines

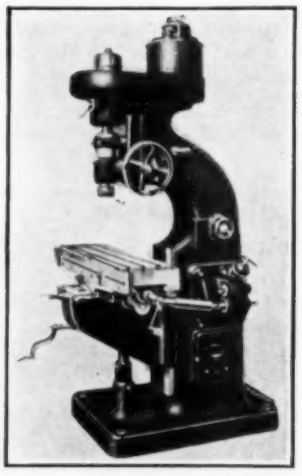
— 34 —

Miller, Vertical, Electrically-Driven

United Machine Tool Co., Ltd., Gray's Inn Road, London, W. C., England. [Vol.67,p.50E]

The spindle of this machine has 42 speeds obtained from a vertical variable-speed d.c. motor. The motor is placed on top of the machine and drives the spindle through a train of gears, the speed range being 25 to 300 rev. per minute.

The table of the machine has a working surface of about



36x12 in. and has automatic longitudinal feed of 28½ in., a cross-feed by hand of 13¾ in., and a vertical movement by hand of 18¼ in. The spindle itself has a vertical traverse by hand of 5½ in. and the maximum distance from the table is 21¾ in. The spindle is bored ⅝ in. all the way through.

Eight feeds are available. About 2-hp. is required for driving. A circular graduated table, operated either by hand or power, is also available. The central hole is tapered to take an arbor.

— 35 —

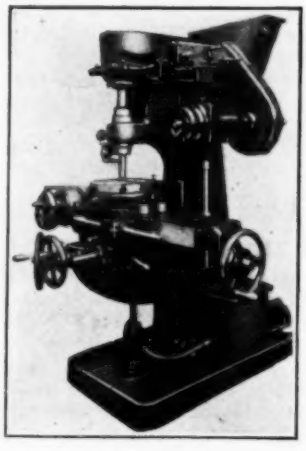
Milling Machine, Vertical, All-Geared

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.99E]

This machine has been redesigned and furnished with single-pulley drive. The table now has a working surface of 49x10¾ in., with 30 in. longitudinal automatic feed. The transverse adjustment is 12½ in. and the vertical adjustment of the knee 17 in. Three movements are provided with adjustable graduated index disks.

The spindle speeds range from 51 to 500 r.p.m. in eight changes. The gears in the head are made of hardened steel running in an oil bath, and the final drive to the spindle is through spiral bevel gears.

Nine feeds are available, and the various rates are marked on the beveled edge of a handwheel dial. The feeds are independent of the spindle speeds.

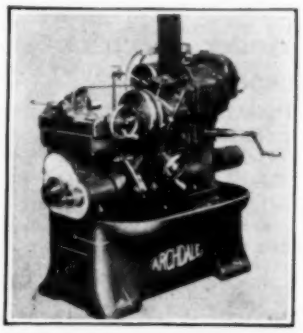


— 36 —

Miller, Cam and Profile, Horizontal

J. Archdale & Co., Ltd., Birmingham, England. [Vol. 67, p.121E]

The automatic cam and profiling machine will deal with work up to 8 in. in diam. by 8 in. long. It is of the type in which the work and former rotate on a common spindle carried on a swinging arm, the former being maintained in contact with a roller by means of weights. The bed provides slides for the cutter spindle



head and for the former roller. The drive is by a tight and loose pulley.

The cutter spindle runs on adjustable conical bearings near the nose, with provision for adjustment. A lever on the spindle head controls the back gear change and four additional changes are obtained through slip gears in the head. Eight speeds are available.

The work spindle is automatically rotated by double reduction worm gears contained in the swinging arm. The maximum speed of the work spindle is 3 r.p.m. and the minimum one.

Floor space, 5 ft. 3 in. x 4 ft..; weight, 3,136 lb. net.

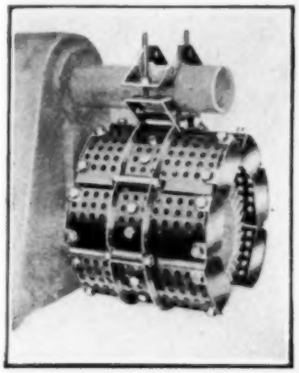
— 37 —

Milling Cutter Guard, Improved

Edward Williams, Foundry Lane, Soho, Birmingham, England. [Vol.67.p.34E]

The side flange of this guard extends beyond the root of the teeth of the cutter. The guard is carried on the overhanging arm of the milling machine by clips made especially to suit each size of arm. Attached to the clips are side blocks on which the guard is adjusted vertically.

For inspecting the work, the guard is arranged to open by swinging upwards on the tubular portion which is also designed as a lubricant distributor. The side flanges will cover cutters up to 5 in. in diam., two lengths being made for cutters up to 6 in. and 9 in. long respectively.



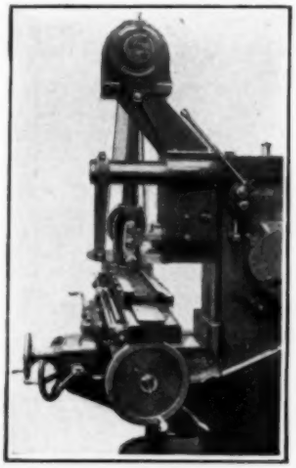
The device is built up of standard interchangeable sections in any number according to the diameter and length of the cutter to be covered. For attaching to the overhanging arm of the machine, a standard hexagonal bracket is employed.

— 38 —

Milling Machine, Attachment, Automatic Rack Cutting

J. Parkinson & Son, Shipley, England. [Vol.67,p.95E]

An automatic rack-cutting attachment has been fitted to the No. 2T universal milling machine made by this company. It is equally suitable for plain milling machines and can be supplied to larger sizes. It is intended for cutting the teeth of



certain kinds of racks and slotted bars used in textile and other machinery. With the slide and vise shown a rack 24 in. wide by 36 in. long can be cut in one setting.

The cutter spindle is carried at the end of a long lever which swings like a pendulum from a fulcrum pin carried by a bracket from the overarms of the milling machine. The radial action of the pendulum causes the teeth of the rack to be cut slightly hollow at the bottom, but for the purpose for which the racks cut by this appliance are used, this is not an objection.

The drive is by belt from a 1.4-hp. motor. The reciprocating motion of the pendulum is obtained from a cam, which can be changed to permit various lengths of stroke being made. The indexing mechanism consists of a master rack with rack-shaped teeth and pawls.

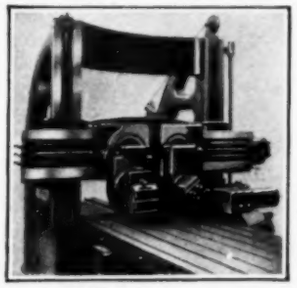
Planers and Shapers

— 39 —

Planer with Semi-Circular Planing Heads

White Machine Tool Co., Ltd., Halifax, England. [Vol. 66,p.196E]

In addition to ordinary work, this motor-driven planer was designed to plane semi-circular troughs in laundry machinery beds by the introduction of special rotary tool boxes. It will admit work from 5 to 15 ft.



long. The offset tool boxes allow the tools to come very close together for planing simultaneously both sides of narrow work, while the offset side tool box allows the latter to plane right up to the cross slide without undue overhand.

A selective gear box provides eight rates of feed. The feed motion is taken from a 3½-hp. motor which also drives the quick power traverse.

The bed of the machine is 24 ft. long by 2 ft. deep, while the work table is 16 ft. long by 4 ft. 7 in. wide.

The main drive is by a 24-hp. reversing motor. The cutting speeds available vary from 20 to 70 ft. per min. with return speeds of 90 to 140 ft. per min. Table motion can be controlled from either side of the machine.

The floor space is 34 x 14 ft.; overall height, 11 ft.; weight, 24 tons net.

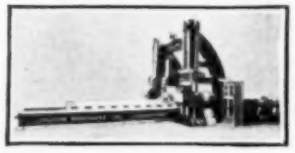
— 40 —

Planer, Electrically-Driven

Loudon Bros., Ltd., Johnstone, England. [Vol.67,p.39E]

The electrically-driven machine illustrated will plane work 9 ft. wide by 10 ft. high by 20 ft. long. The drive, feed, and traverse are controlled by push buttons and the speeds, feeds and stroke adjusted from the operating position electrically.

The machine has two tool boxes on the cross-slide and one on each upright, both of the lat-



ter being arranged with automatic horizontal in-cutting as well as vertical feed motion. The table is of hollow section and the bed has a covered top, with provision for returning the lubricant to reservoirs. The uprights are of box section.

The feed motion is driven by a separate motor which also actuates the power traverses. These motions are interlocked and controlled by push buttons. Safety switches are provided to all tool boxes to prevent damage to overrun.

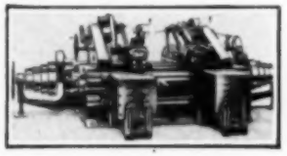
The machines are made up to 15 ft. wide by any length of stroke. Cross and end planing attachments can be supplied.

— 41 —

Shaper, Duplex, 24-26-Inch Stroke

Graham & Normanton, Halifax, England. [Vol.67,p.190E]

Each ram of this double traversing head shaping machine of 24-26-in. stroke is of central thrust type with a solid base to prevent springing. The drive is by a steel connecting rod operated by a Whitworth mo-



tion The ram block is centrally held in longitudinal slots provided in the walls of the ram, and the faces of the ram have serrated plates to prevent slipping. The driving wheel is indexed to indicate the length of stroke.

A friction down feed motion of improved design has been introduced and the tool boxes are so arranged that no stop collars are required.

The bed measures 8 ft. long x 2 ft. 7 in. across the top and is 2 ft. 9 in. deep. Each head has a traverse of 3 ft. 3 in. along the bed. The front has the usual planed slotted ways for supporting the table apron and provision is made for taking up wear between the bed and carriage slides. The drive is from a four-step cone pulley.

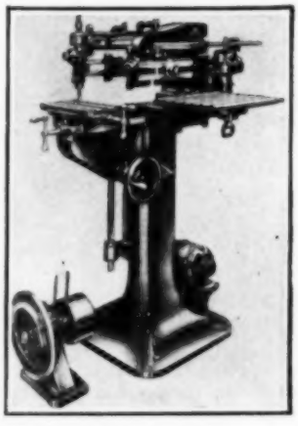
Other Machines

— 42 —

Engraving Machine, Universal

Selson Engineering Co., Ltd., Charles St., London, E. C., England. [Vol.67,p.189E]

The particular feature of this machine is the accuracy obtainable in setting for the reduction



from the copy to the actual work and the rigid girder construction of the arms whereby the reduction is effected. Ball bearings are used wherever possible.

Spindle speeds up to 12,000 r.p.m. may be had. The cutter spindle runs in hardened and ground steel bearings.

Independent adjustment of the side arms and front arm can be effected, thus giving an alteration in the width and height of the figure respectively.

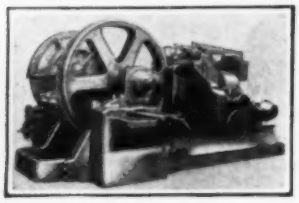
The rigidity derived from the girder construction of the arms renders the machine particularly valuable for embossing work.

— 43 —

Gear Generator, Double-Helical, Sunderland, 10-Foot

J. Parkinson & Son, Shipley, England. [Vol.66,p.190E]

The machine will cut double-helical gears with continuous or staggered teeth up to 10 ft. in



diam., 24 in. face, 1 d.p. or 3 in. c.p. Attachments may be supplied for cutting spur gears up to the same dimensions and at a slower rate, pitches up to 4 in. c.p. and also spiral gears within a limited range of face and angle.

The cutter spindle is driven by a 25-hp. motor, through a flexible coupling. There are two eccentric shafts for driving the cutter slides.

To change the machine for cutting spur and spiral gears, the double-helical slide is lifted away without disassembling it. For cutting spur gears only, the slide is fitted with a double-acting cutter box that takes two cutters, a roughing and a finishing one, placed back to back so that the cutting may be done on the forward and return strokes of the slide.

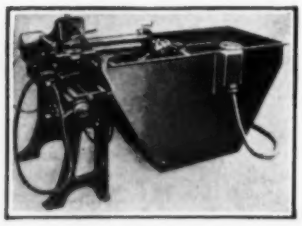
The bed of the machine contains a tank, and a pump provides a supply of cutting lubricant. Automatic lubrication is featured.

— 44 —

Gear Hardening Machine, Modified, Shorter

Patent Gear Hardening Company, Ltd., Horseferry Road, Westminster, S.W. England. [Vol.67,p.111E]

The principal modification consists of making the apparatus in two entirely independent units, namely, the quenching tank and the mechanism for



controlling the movement of the burner and quenchers. By this means, work of any proportion can be readily accommodated. Tanks of any size may be employed in conjunction with the standard burner-carrying mechanism, while the slides for the burner carriage may be lengthened to give an increased range of travel.

A bed on which is placed the burner carriage occupies a position immediately adjacent to the tank. An arm extends over the tank and carries the burner by means of a vertically-adjustable slide so that the burner may be set to the required position over the gear, while uniform travel along the tooth flank is given by the movement of the carriage on the bed.

Power is obtained by a small motor through friction discs, the rate varying from two to 40 ft. per hour.

— 45 —

Cutting Machine, Oxygen-Jet, Universal, Large Size

Godfrey Engineering Works, Boundary Road, Wood Green, London, N., England [Vol.67, p.53E]

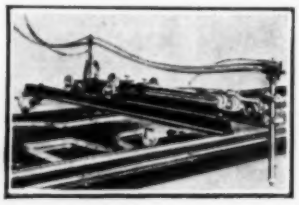
This machine is described under item 256, of the American section of this review (*q.v.*).

— 46 —

Cutting Machine, Oxygen, Profile, Automatic

Hancock & Co., (Engineers) Ltd., Aurelia Road, Croydon, England. [Vol.67,p.62E]

The unit shown is a standard self-contained machine having a working area of 18x3 ft., and will cut profiles of any shape within this area at one setting



automatically. The range can be extended by lengthening the table and main rails, and more than one cutting head can work independently on the rails.

The cutting burner is carried at the end of an overhanging arm which has lateral adjustment for final setting, and is controlled, as to shape produced, by a templet. The templets are made of aluminum strip.

Working in connection with the templet is a tracer, driven by a self-contained electric motor of fractional horsepower. The speed of travel is controlled by variable resistance and a ball governor.

— 47 —

Cutter, Oxy-Acetylene, Portable

Liquid Air, Ltd., Wembley, Middlesex, England. [Vol.67, p.87E]

The oxy-acetylene cutting machine was designed for cutting locomotive frames and for repe-

tition work generally that will warrant the making of a former. For the former or templet, a flat iron bar is bent to the shape required, thus providing a rail on which the cutting unit travels.

The cutting unit itself is portable and can be used in any desired position in the shop. A small universal motor forms the driving means. The motion is transferred through a reduction gear to a small interchangeable gear box. Eight of these boxes are supplied and provide sixteen changes of speed.

The oxy-acetylene cutter nozzle is carried at the front of the unit, and is vertically adjustable.

— 48 —

Press, Heavy-Duty, 200-Ton

Henry Pels, Osnaburgh St., London, S.W., England. [Vol. 67,p.54E]

For a description of this machine see Item 167 in the American section of this review.

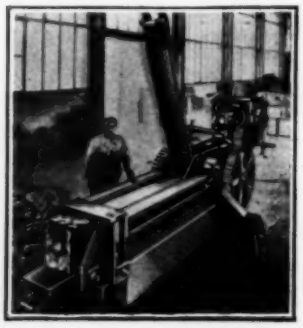
— 49 —

Bundling Press for Sheet Metal Scrap

Demag A. G., Duisburg, Germany. [Vol.67,p.120E]

Contrary to the method of construction usually followed, the ram of this press is arranged horizontally, thus making it possible to use one of the long sides of the bundling box as an inlet for dumping in the raw material. This box is of trough form and consists of standard sections and plates riveted together. On the inside it has replaceable wearing liners with longitudinal grooves. When charging is completed the press is closed by turning down its lid, which is balanced by a counterweight.

Grooves on the ram prevent the scrap slipping between the ram and the sides of the box during the pressing process. When the scrap is compressed



sufficiently, the motor is cut off automatically. The ram can also be used to extrude the bundle.

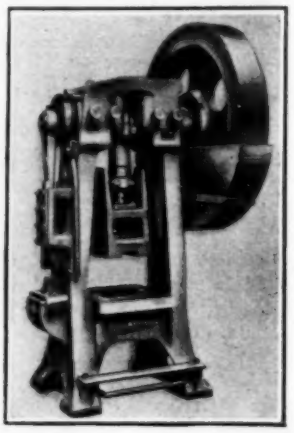
Under average conditions, with a 25-hp. motor, the press turns out 15 bundles per hour.

— 50 —

Press, Trimming

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.67,p.166E]

The frame of this machine is a casting designed to give maximum support for the crankshaft and reciprocating ram and to leave a large clear space available for tools. The table



has holes and slots both at back and front and two cast iron bolsters facilitate rapid tool setting.

The steel crankshaft is supported by the main bearings right up to the crankpin on both sides. The balanced flywheel is bushed with phosphor bronze. The ram is an iron casting working in adjustable slides and dovetailed at the bottom to carry the upper tool.

The machine is made in three sizes, giving effective pressures respectively of 120, 200, 320 tons. The machine shown in the illustration is suitable for a 1,500 lb. stamp. The stroke is 3½ in., and 65 strokes per min. are made. The distance between uprights is 23 in. and the planed table is 23x21 in. With this machine mild steel bars 1½ in. square can be sheared cold.

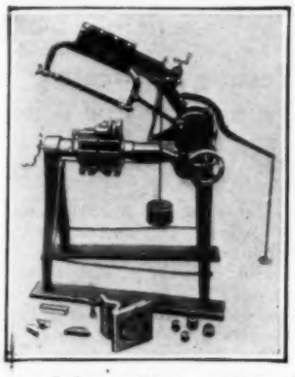
— 51 —

Sawing Machine, Universal

R. Price & Sons, 213 Putney Bridge Rd., London, S.W., England. [Vol.66,p.264E]

In addition to fulfilling the usual functions of a hack saw, this machine is designed to perform a number of operations that would otherwise require the services of a shaping, milling or slotting machine.

The standard hack saw blade



is used for ordinary sawing of bars, while for cutting keyways and slots and for shaping various parts, a broach type of saw is used. Blind keyways and feather slots may also be cut with a single cutter in place of the multiple tooth saw.

The work holding device consists of a revolving box table having four sides, to which the work is strapped. The sides may carry the swivel vise, angle plates or special fixtures. A round portion of the frame forms the vertical axis upon which the table revolves. In addition, the table has longitudinal adjustment.

The saw arm is directly balanced by weights and no release motion is employed. The saw arm, together with all its mechanism is supported by the carriage so that cross adjustment of the latter enables the saw to operate in different positions across the work.

— 52 —

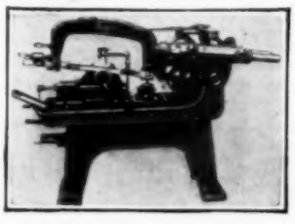
Hack Saw Machine, Improved

E. G. Herbert, Ltd., Levenshulme, Manchester, England. [Vol.67,p.120E]

Rapidor metal sawing machines are made at present in two sizes with capacities respectively of 6x6 in. and 8x8 in. The drive may be single-speed or three-speed, either by belt or motor, or a variable-speed direct current motor may be used.

The vise is of screw type and has a loose jaw which swivels for holding taper work. The vise itself can be swivelled for making cuts at an angle, or can be removed.

An indicator is provided for the blade tension. This company's starting valve and dashpot enable cuts to be started on sharp corners without the necessity of filing a flat. The dashpot prevents the frame from



falling should the blade break. Except in the case of the three-speed geared machine, an adjustable automatic stop is used to halt the machine to any required depth to cut.

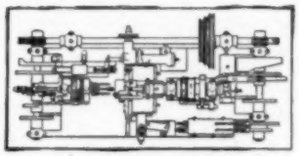
Adjustable automatic lift of the blade for return strokes is obtained from the dashpot in conjunction with the angular setting of the saw. The saw frame is guided by two square slides with diagonals and verticals.

— 53 —

Screw Machine, Automatic, Swiss

Whitaker & Son, Chandos House, Buckingham Gate, London, S. W., England. [Vol.67, p.64E]

This screw machine made by S. Lambert, Ltd., Grenchen, Switzerland, is available in three sizes, the largest to turn $\frac{5}{8}$ in. in diam. by $3\frac{1}{2}$ in. long. A threading device is included



for completing screws, and formed and knurled parts can also be turned. The smallest machine will turn work up to $\frac{3}{32}$ in. in diameter.

The machine is intended for bench purposes and most of the work within the capacities of the tools can be produced with standard cams. Two sets of cams are employed, one controlling the cutter holders, spindle clutch and work head, while the other controls the screwing mechanism and the head-slitting device. The two sets are moved in unison by means of worm gearing driven through a cone pulley to secure the variation of speed at which the cycle of operation is performed.

— 54 —

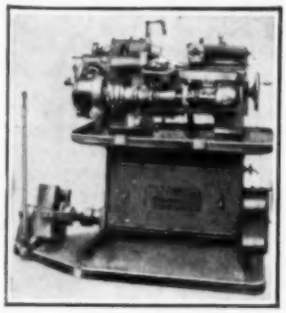
Screw Machine, Automatic

B. S. A. Tools, Ltd., Sparkbrook, Birmingham, England. [Vol.67,p.149E]

The automatic screw machine will turn any length of work up to 3 in. with provision for using one hole in the turret to receive 6-in. stock. The largest feeding finger will admit $\frac{7}{16}$ in. bars through a feed tube of $\frac{13}{32}$ in. diam., but one can also be supplied for brass bars up to $\frac{3}{8}$ in. in diameter.

The machine is available in three styles, one having two forward and two reverse speeds, another one forward and one reverse, and the third with one forward speed only.

Six change gears of the pick-



off type provide 36 spindle speeds in geometric progression from 243 to 2,490 r.p.m. The maximum distance from the front of the chuck to the face of the turret is $5\frac{1}{4}$ in. with a minimum distance of $2\frac{1}{4}$ in. Cross-slide tools are placed on separate long slides and can be operated simultaneously or separately. All operations are controlled by cam shafts at the front end of the machine.

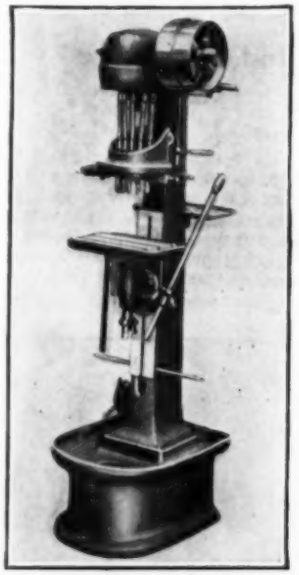
— 55 —

Tapping Machine, Multiple-Spindle

S. Wolf & Co., Ltd., Southwark St., London, S. E., England. [Vol.67,p.48E]

The tapping machine has an automatic reverse gear which takes the form of two driving bevel gears, one on each side of the main gear, either being put into operative position by means of a clutch moved by the work itself through the medium of a finger, vertical rod, and spring. The part to be tapped is placed on an open jig on the drilling table and raised to the taps by means of a foot or hand lever.

With this machine it is possible to tap holes of two dif-



ferent pitches simultaneously. The smaller tap is spring-supported and the spindle has a sliding movement in relation to the collet.

The machine is available with either ten or thirteen spindles, and is similar in design to the multiple-spindle drilling machine recently put on the market by this company.

— 56 —

Thread-Milling Attachment, Universal

Selson Engineering Co. Ltd., Charles St., Hatton Garden, London E. C., England. [Vol. 67,p.178E]

The universal thread-milling attachment illustrated can be fitted to any standard lathe. The method of cutting is similar to that employed on thread-milling machines where a rotating disk cutter travelling parallel to the axis of the work

produces a thread in conjunction with the rotation of the work.

The attachment is built in three sizes to cut diameters up to $2\frac{5}{16}$, $5\frac{1}{2}$ and $11\frac{3}{4}$ in. respectively, the maximum pitches being $1\frac{1}{8}$, $7\frac{1}{16}$ and $9\frac{7}{16}$ inches.

The attachment consists of two main units. The change speed reduction gearbox and the cutter head. The gearbox is bolted to the faceplate of the lathe and carries a single driving pulley. The cutter head is carried on the saddle of the lathe. The drive is taken from a continuation of the main pulley shaft, while the travel of the cutter necessary to effect the lead of the thread is obtained from the usual screw-cutting feed of the saddle.

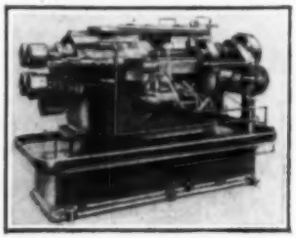
Both right- and left-hand threads may be cut and in addition annular or straight grooves.

— 57 —

Supermatic, Four-Spindle

B. S. A. Tools, Ltd., Sparkbrook, Birmingham, England. [Vol.67,p.188E]

The machine is made both for chucking and bar work, the former taking up to $4\frac{1}{2}$ in. in diam. and the latter up to $2\frac{1}{2}$ in. in diam. In each case the longest



feed of the tool slide is 7 inches.

The base is cast with the pan and carries the four-spindle headstock and the frame for the main tool slide. A top plate ties the spindle end with the drive end of the machine and provides a guide extension to help maintain alignment of the main tool slide in relation to the work spindles. Opposite the work spindles are four end-tool positions located on the main tool slide, while two side-working tools operate from the independent forming slide positions.

All movements of the machine are cam controlled, and the machine is fully automatic except for loading and removing the work in the chucking machine.

The spindle speeds may be varied by change gears from 96 to 600 r.p.m. The main drive is by a single pulley.

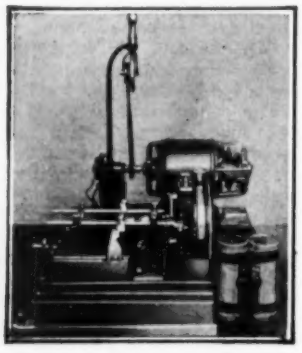
Balancing, Gaging and Testing Equipment

— 58 —

Balancing Machine, Dynamic

C. F. R. Giesler, Ltd., Gray's Inn Road, London, W. C., England. [Vol.66,p.288E]

This small dynamic balancing machine is for balancing the armatures of fractional-horsepower motors and other small units. Two models are available, one for bodies weighing from 7 oz. up to 2¼ lb., the other up to 11 pounds.



The special feature of the machine is a compensating adjustment that neutralizes the state of unbalance at one end of the body so that the amount of unbalance may be determined and corrected at the other.

The members carrying the work are fitted with roller bearings and have longitudinal adjustments at different distances between the journals. The drive is transmitted from a small motor to a friction disk carried on a swinging arm. The body being tested is put in motion by swinging the disk into contact.

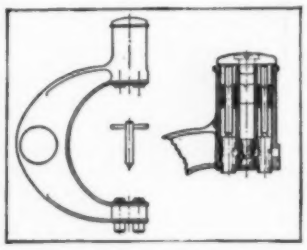
— 59 —

Caliper Gage, Adjustable

Fox & Offord, Ltd., Alma Street, Birmingham, England. [Vol.66,p.289E]

The improvements embodied in the special head of this caliper gage, allow very fine adjustments to be made with increased precision. The operator has ready access for effecting these adjustments. The method of locking has also been improved.

The improvements apply chiefly to limit gages of the Go and Not-Go type, although applicable to caliper gages where only one adjustable face is provided. The illustration shows a complete gage and a section of the adjusting head. The design incorporates differential screws.



— 60 —

Indicator Gage

Coats Machine Tool Co. Ltd., Palmer St., London, S. W., England. [Vol.67,p.158E]

The new Krupp gage is simple to use and combines extreme accuracy with clear and easy optical readings. Various attachments may be adapted for gaging practically all forms of regular commercial work. It operates on a comparative principle, in that the gage is first set to a master and then shows any deviation from nominal size. It can indicate to 0.00004 in. by a pointer passing over a divided sector.

Particular advantages are claimed for the method of transforming the axial movement of the work contact rod into a swinging movement of the pointer. This mechanism embodies the principle of a spring-controlled horizontal beam with pressure at one end to cause the tilting motion.

Besides being suitable for the test or inspection bench, the gage may be used on the work during production. The saddle carries renewable and interchangeable locating plates of steel, which may be reground when necessary. A self-accommodating internal gage is shown in the illustration.

— 61 —

Testing Apparatus, Transverse, For Wires

T. C. Howden & Co., Fleet St., Birmingham, England. [Vol.66,p.278E]

The special apparatus made by Alfred J. Amsler & Co., Schaffhouse, Switzerland, is for making transverse tests of metal wires. The specimen rests on two end supports and is pressed downwards in the center by means of a middle support. The transverse load is indicated by an index on a scale.

The distance between the end supports can be varied as required from about 2 to 10 in. The greatest thickness of wire that can be tested is ⅜ in. and the maximum load that can be applied is 40 pounds.

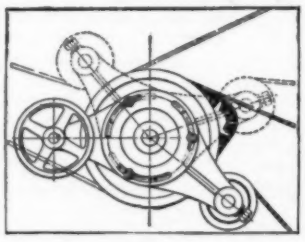
Miscellaneous Equipment

— 62 —

Pulley, Variable-Speed

Crofts (Engineers), Ltd., Thornbury, Bradford, England. [Vol.66,p.272E]

The pulley is composed of two conical sections, one fixed on the shaft, while the other slides in the usual way. A handwheel and screw is used to make the necessary adjustments. A V-section belt forms what may be described as the driving bed between the two cones.



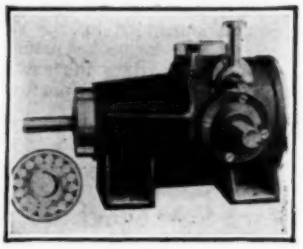
The ordinary driving belt runs on the top of this V bed and, as the tightness of the belt changes with variation in the diameter of the driving bed, the slack is taken up by the automatic belt-tensioning device carried on the supporting arms.

— 63 —

Friction Gear, Variable-Speed

Keenok Co., Ltd., Eleanor St., Bow, London, E., England. [Vol.67,p.76E]

Mechanically, the device consists of a disk rotating at constant speed, together with a circular pinion, the rim of which bears at any desired radius on the face of the disk. It is possible to obtain a reduction from equal speeds down to one-tenth the speed of the constant-speed shaft under full rated load. The working parts



are of hardened and ground steel and run in oil throughout, the boxes being dust- and oil-tight.

The pinion is of special construction and has a plain rim that is allowed some amount of diametral movement relative to the center. The center is formed into a number of cam surfaces in which rollers are placed. When the drive is exerted, the rim tends to assume a slightly out of center position which is counteracted by the action of the roller, thus increasing the contact pressure.

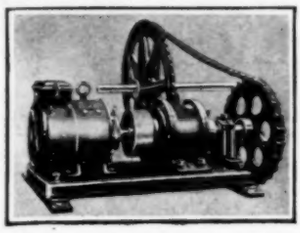
— 64 —

Gear Box, High-Reduction

Crofts (Engineers), Ltd., Thornbury, Bradford, England. [Vol.67,p.111E]

A reduction of 2 to 1 is given by the chain gearing, while an eccentric speed transformer provides a reduction of 7,615 to 1. With an input speed of 1,550 r.p.m., the final speed is 6 rev. per hour.

The speed transformer con-



tains a double pinion mounted on an eccentric. The two pinions are solid, one gearing with a fixed internal wheel in the form of a steel ring, and the other with a movable internal gear. The two pinions differ slightly in number of teeth. The eccentric causes the pinion to roll around and give a creeping motion to the final gear. The eccentric shaft is balanced to assure smooth running.

— 65 —

Belt-Fastening Tool

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.137E]

The above company is handling, in the British Isles, the Seifert belt-jointing tool by means of which a series of copper loops are inserted into the

ends of belts. A rawhide pin is then slipped through the two sets of loops to join the belt together.

This tool is used in an ordinary vise and will handle belts of any thickness up to 3 in. wide in one operation. Other widths must be treated in a series of operations.

— 66 —

Machine Vise

A. S. Vice Co., Sumner Rd., West Croydon, England. [Vol. 67,p.67E]

The machine vise is available in four standard sizes, the smallest having jaws 4 in. wide and an opening of 3 1/8 in. while the largest has jaws 6 3/4 in. wide and an opening of 6 3/4 in. Vises of each size can also be had with solid bases.

The main casting carrying the fixed jaw is planed and T-slotted and has semi-circular recesses to take a cast-iron barrel piece which holds the stem carrying the moving jaw.

— 67 —

Vises, Bench and Machine

Weardon & Guylee, Ltd., Bradford, England. [Vol.67,p. 112E]

Both forms of the vise swivel on vertical and horizontal axes so that the base can be rotated to any position required and

locked, while the jaws can be inclined and locked at any angle up to 90 deg.

The machine vise, which, for some purposes, may take the place of a jig, has self-centering jaws adjustable in the usual way by screws.

The bench type can be used for drilling machines while the machine type is advantageous on milling, shaping, and planing machines. Both types are available in five sizes.

— 68 —

Output-Recorder, Electro-Mechanical

Fox & Oxford, Ltd., Alma St., Birmingham, England. [Vol. 66,p.259E]

The apparatus was built for use in the planning department of a large plant. In or near the manufacturing departments concerned, a distribution board or transmitter is placed, consisting of a selector for 20 units, and a transmitter that records the quantity going over the weighing scale.

When a batch of material has been weighed, the checker electrically transmits the weight to the chart which is placed in the planning department and consists of a series of vertical scales, each for the particular unit or material being produced. The chart shows the daily output per week, and a blue line on each scale indicates the daily output arranged for each unit.

— 69 —

Coolant Pump for Machine Tools

Vidal Engineering Co., Thornton Rd., Croydon, England. [Vol.66,p.266E]

The electrically-driven pump is intended to supply plain or soda water to the machines to which it is necessary to supply a coolant. While the necessary

filter plate is embodied in the construction to protect the impeller from fairly large objects, the pump will pass chips up to 1/16 inch.

Its general design is quite simple. At the top is a completely-inclosed vertical motor and below this a hollow flanged stem is secured. At the bottom is an end piece by which the impeller is closed.

— 70 —

Pyrometer, Optical

Bowen Instrument Co., Newton Road, Leeds, England. [Vol. 67,p.46E]

This pyrometer of optical type is for use in workshops, and is suitable for temperatures in the region of visible heat up to 4,000 deg. C. The instrument, called the Optix, is light, weighing just a little over 3 lb., and is compact, measuring 4 in. in diam. by 9 in. long overall.

In this pyrometer the light intensity of a hot body under observation is compared to that of a small electric lamp, the two intensities being brought to equal absorption. The operator looks through the eyepiece towards the hot body and focuses upon it. A milled ring

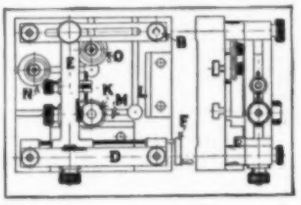
is then turned until the light from the body is matched with that from the lamp and the temperature read directly on a scale.

— 71 —

Jig Tools, Adjustable

Ratcliffe Co., Ltd., Clun House, Surrey St., London, W. C., England. [Vol.67,p. 50E]

Jig tools of two different types, each of which may serve either as an adjustable jig for duplicating holes in work or as a master tool for drilling jigs themselves, are available. With



the first tool, holes can be drilled or marked out along ordinates at right angles. The second tool is for drilling or marking holes rapidly in any angular location, and on any circle within its capacity.

The illustration shows the right angle tool. This tool is made in three sizes, the smallest taking work up to a 3-in. cube and the largest for work up to a 9-in. cube.

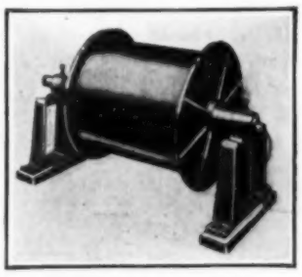
For the circular tool, three sizes are available to cover circles 6, 12, and 24 in. in diam., respectively.

— 72 —

Magnetic Separator, High-Intensity

Rapid Magnetting Machine Co., Ltd., Birmingham, England. [Vol.67,p.72E]

The high-intensity separator is intended to deal with considerable quantities of metal turnings containing large percentages



of iron. It is also used for extracting iron from tea, cocoa, and similar foodstuffs, and from clinker, powdered fuel, and granular material generally.

The separator is specially wound to have high-permeability cores so that the magnetic strength is considerably increased.

INDEX OF MANUFACTURERS

European Edition

— A —

A. S. Vise Co.,
Sumner Rd.,
West Croydon, England
Machine vise 66 159

Ackworthie & Co., Ltd., John,
Coleshill St.,
Birmingham, England
Six-spindle horizontal drill..... 6 149

Amsler & Co., Alfred J.,
Schaffhouse, Switzerland
Traverse testing apparatus for wires 61 158

Archdale & Co., Ltd., J.,
Birmingham, England
Horizontal cam and profile miller 36 154

Armstrong, Whitworth & Co., Ltd.,
Openshaw, Manchester, England
Vertical boring mill with turret and side head 3 149
Grinder for circular cutters.... 24 152
Improved axle shaft lathe..... 33 154

Asquith, Ltd., W.,
Halifax, England
Drilling and countersinking machine for locomotive wheel tires 15 151

Atalanta, Ltd.,
1-3 Brixton Rd.,
London, S. W., England
Drilling jig for round stock.... 18 151

— B —

B. S. A. Tools, Ltd.,
Sparkbrook, Birmingham, England
Centerless grinders 21 152
Automatic screw machine..... 54 157
Four-spindle Supermatic..... 57 157

Bowen Instrument Co.,
Newton Rd., Leeds, England
Optical pyrometer 70 159

Buckton & Co., Ltd., J.,
Leeds, England
Large-size horizontal boring machine 2 149

— C —

Carter & Wright,
Halifax, England
Horizontal duplex-spindle slot drill 12 150

Churchill Machine Tool Co., Ltd.,
Broadheath, near Manchester, England
Double-ended axle-journal, regrinding machine 26 153

Coats Machine Tool Co., Ltd.,
Palmer St.,
London, S. W., England
Krupp indicator gage..... 60 158

Crofts (Engineers), Ltd.,
Thornbury, Bradford, England
Variable-speed pulley 62 158
High-reduction gear box..... 64 158

— D —

Dean, Smith & Grace, Ltd.,
Keighley, England
Buffer-turning lathe 32 154

Demag, A. G.,
Duisburg, Germany
Bundling press for sheet metal scrap 49 156

Drummond Bros. Ltd.,
Guildford, England
Improved Maxicut lathe..... 29 153

— F —

Fox & Oxford, Ltd.,
Alma St., Birmingham, England
Adjustable caliper gage..... 59 158
Electro-mechanical output-recorder 68 159

— G —

Giesler, Ltd., C. F. R.,
Gray's Inn Rd.,
London, W. C., England
Dynamic balancing machine.... 58 158

— G — *(Continued)*

Godfrey Engineering Works,
Boundary Rd., Wood Green,
London, N., England
Large-size universal oxygen-jet cutting machine 45 156

Graham & Normanton,
Halifax, England
Duplex shaper, 24-26-inch stroke 41 155

— H —

Hancock & Co., (Engineers), Ltd.,
Aurelia Rd., Croydon, England
Automatic profile, oxygen cutting machine 46 156

Herbert, Ltd., Alfred,
Coventry, England
Electrically-driven surface and die grinder 22 152
All-geared vertical milling machine 35 154
Belt-fastening tool 65 159

Herbert, Ltd., E. G.,
Levenshulme,
Manchester, England
Improved hack saw machine.... 52 157

Howden & Co., T. C.,
Fleet St., Birmingham, England
Drill testing apparatus..... 17 151

— J —

Jigs, Ltd.,
15 Great James St.,
London, W. C., England
Special multiple-spindle drill heads 19 152

Jones & Shipman, Ltd.,
Leicester, England
Sensitive drill, 16-inch..... 5 149

— K —

Keenok Co., Ltd.,
Eleanor St., Bow,
London, E., England
Variable-speed friction gear..... 63 158

Kellenberger & Co., L.,
St. Gall, Switzerland
Cylinder boring and grinding machine 4 149

Kitchen & Wade,
Halifax, England
Girder radial drill, 6-foot..... 9 150
Eight-spindle horizontal drill for crankshafts 14 151

— L —

Liquid Air, Ltd.,
Wembley, Middlesex, England
Portable oxy-acetylene cutter... 47 156

Loudon Bros., Ltd.,
Johnstone, England
Electrically-driven planer..... 40 155

— M —

Massey, Ltd., B. & S.,
Openshaw, Manchester, England
Trimming press 50 156

Midgley & Sutcliffe,
Bradford, England
Radial drill, 4-foot..... 11 150

— P —

Parkinson & Son, J.,
Shipley, England
Automatic rack cutting attachment for milling machine.... 38 155
Sunderland double-helical gear generator, 10-foot 43 155

Patent Gear Hardening Company, Ltd.,
Horseferry Road,
Westminster, S. W., England
Modified, shorter gear hardening machine 44 156

— P — *(Continued)*

Pels, Henry,
Osnaburgh St.,
London, S. W., England
Heavy-duty press, 200-ton..... 48 156

Price & Sons, R.,
213 Putney Bridge Rd.,
London, S. W., England
Universal sawing machine..... 51 156

— R —

Rapid Magnetting Machine Co., Ltd.,
Birmingham, England
High-intensity magnetic separator 72 159

Ratcliffe Tool Co., Ltd.,
Clun House, Surrey St.,
London, W. C., England
Adjustable jig tools..... 71 159

Redman & Sons, Ltd., C.,
Halifax, England
Improved center lathe, 15-inch.. 27 153

Richards & Co., Ltd., G.,
Broadheath, near Manchester, England
Horizontal duplex slot drilling machine 13 151

— S —

Scott Bros. (Halifax), Ltd.,
Halifax, England
Radial girder drill, 6-foot..... 10 150

Selson Engineering Co., Ltd.,
Charles St., London, E. C., England
Horizontal boring machine with flange motor 1 149
Automatic drill chuck 20 152
Universal engraving machine... 42 155
Universal thread-milling attachment 56 157

Swift & Sons, Ltd., G.,
Halifax, England
Wheel-turning and boring lathe. 31 153

— T —

Town & Sons, F.,
Halifax, England
Three-spindle drilling and trepanning machine 16 151

— U —

United Machine Tool Co., Ltd.,
Gray's Inn Road,
London, W. C., England
Braun lathe, 8-inch..... 28 153
Electrically-driven vertical miller 34 154

— V —

Vidal Engineering Co.,
Thornton Road, Croydon, England
Suspended electric grinder..... 25 153
Electrically-driven coolant pump for machine tools 69 159

— W —

Ward, Haggas & Smith,
Keighley, England
Combination lathe, 60-inch..... 30 153

Wearden & Guylee, Ltd.,
Bradford, England
Bench and machine vises..... 67 159

Whitaker & Son,
Chandos House, Buckingham Gate,
London, S. W., England
Automatic Swiss screw machine 53 157

White Machine Tool Co., Ltd.,
Halifax, England
Vertical multiple-spindle drill... 8 150
Planer with semicircular planing heads 39 155

Williams, Edward,
Foundry Lane, Soho,
Birmingham, England
Improved milling cutter guard.. 37 154

Wolf & Co., Ltd., S.,
Southwark St.,
London, S. E., England
Vertical multiple-spindle drilling machine 7 150
Multiple-spindle tapping machine 55 157

Wunderli, Fritz,
Uster, Switzerland
Universal tool and cutter grinder 23 152

The Business Barometer

The outlook in Commerce, Finance, Agriculture and Industry

By THEODORE H. PRICE

Editor, Commerce and Finance, New York

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"THE FURTHER off from England the nearer 'tis to France," wrote Lewis Carroll in Alice in Wonderland, and the week's developments indicate that the stock market is appreciably nearer to the inevitable end of the boom that has now out-lasted all of its predecessors.

To say this is not to be pessimistic or misanthropic, for every one knows that prices cannot go up forever and that a further distension of bank credit in carrying securities bought on margin might create a situation that would be highly dangerous.

This is the view taken by many financiers of experience, despite the President's reassuring statement in regard to the huge total to which brokers' loans have risen. Both Mr. Mitchell of the National City Bank of New York and Mr. Wiggin of the Chase National Bank advised caution in the remarks that they addressed to the stockholders in their banks at the annual meetings held during the week. Upon their recommendation the New York Stock Exchange was asked to take the shares of the banks named from its list, and several other financial institutions are expected to follow the lead thus set. The reason assigned is that confidence might be unsettled by sensational fluctuations in bank stocks and that it is wisest to remove them from the speculative arena while the weather is still fair.

As an example of able seamanship in making things fast by way of preparation for a gale this action is highly significant, and although it has not been heeded by the unthinking public many careful men have been led to liquidate their speculative holdings. Hence the stock market has been more two sided than for some time and there have been one or two days when it was acutely weak.

But nothing disturbing is to be inferred from these manifestations, and all will be well if the pyramids that some speculators have erected can be taken down stone by stone instead of being allowed to crash when the quicksands upon which they stand commence to run out.

Thus far, the optimistic forecasts issued at New Years have not been vindicated, and business has continued to jog along at the moderate gait at which it was proceeding in December. Perhaps it is too soon to expect the predicted acceleration, but there is nothing to indicate that the people of the United States are spending more liberally than they were a year ago at this time.

The automobile show in New York has evoked a riot of advertising in the daily papers, and the statement that Ford has orders for 727,000 new cars is uncontradicted. But its accuracy is at least questionable, and to an outsider the competition in the low priced field appears to be very keen. The idea that every family should have at least two motors is being vigorously exploited, although the roads and streets may be impassable if it is generally accepted.

The United States Steel Corporation reports that its unfilled orders at the end of December were 500,000 tons larger than on Nov. 30, and a slight improvement throughout the industry would appear to be indicated. Those who ought to know say that it is chiefly attributable to the buying of the automobile manufacturers. But the facts are hard to get and it will be May or June before we shall really know whether the optimists of the automobile industry are right in predicting that 5,000,000 cars will be sold in 1928. If this prediction should be realized the business engendered would cause an undoubted boom in many lines even though some unrelated industries lagged.

In the commercial as distinguished from the industrial field the trend also lacks definiteness. The demand for textiles seems to be fairly good. The Association of Cotton Textile Merchants of New York reports that the sales of cotton fabrics during December were 109.6 per cent of the reduced production and that unfilled orders at the end of the month show an increase of 13.7 per cent over November 30. But the bullishness of these figures has been in a measure offset by the decrease in the domestic consumption reported for December, the talk of a larger acreage and the increased use of fertilizers.

Corn and wheat have been somewhat firmer. The government estimates the corn crop at 2,786,000,000 bushels, which is 3.9 per cent over 1926. This is very much in excess of last summer's predictions, but there has been a good demand, nevertheless, upon estimates that Europe will require 68 million bushels of American corn and 216 million bushels of our wheat in 1928. The relatively high prices at which cattle are selling have also helped the grain markets and an advance is confidently expected by some experienced dealers.

Rubber is a shade easier, but the tire manufacturers predict an increased consumption. Coffee has changed but little, and advertisements advising its purchase are construed as an indication of uneasiness among those who have bought it upon the idea that government control would put it up. The sugar market has been weak because of President Machado's delay in announcing that he will restrict this year's production to 4,000,000 tons. It is hardly conceivable that he will fail to order restriction, but until the edict is issued holders will be nervous. Meantime, there are some who say that restriction is unnecessary as the crop is very short and next year's consumption in the United States will exceed 6,000,000 tons, refined equivalent. One of the bright spots on the business map is the leather industry. It is better than it has been for years, and the shoe manufacturers are enjoying unusual prosperity.

WHAT'S DOING IN INDUSTRY

THE predictions made earlier in the month—to the effect that the automotive industry would furnish a good part of the first-quarter machinery business—seem to be borne out by the reports from large manufacturing centers. Acceptance by the public of the 1928 models has been the sign for speeding up production in the motor car industry and new equipment is needed in this expansion program.

ALONG this line Detroit furnishes the best barometer. Sales have increased and inquiries are numerous and show urgent need of tools by many large users. Chicago also reflects the improvement, with automotive inquiries leading the activity. The trend of sales is improved in Cincinnati, and Milwaukee reports encouraging activity from a variety of live sources. Cleveland notes an improvement, with sales and inquiries fair.

NEW YORK dealers are busy with demand for deliveries on current inquiries and the sales curve has turned slightly upward since the first of the year. Optimism over the changed situation prevails in Philadelphia, and Buffalo looks for a recovery of volume next month. New England continues uncertain in some sections, the Eastern territory showing some improvement, but the Western district still lagging.

Gears and Forgings, Inc., Brings Together Four Leading Manufacturers

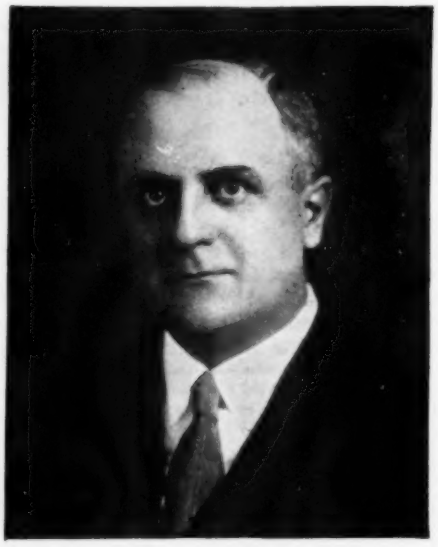
F. W. Sinram heads consolidation in Cleveland

CONSOLIDATION of the Van Dorn & Dutton Co., of Cleveland, the William Ganschow Co., of Chicago and Peoria, the Fawcus Machine Co., of Pittsburg and Ford City, and the Ohio Forge Co., of Cleveland, has just been announced. This consolidation is viewed as one of the most forward strides taken in the gear industry, worked out and consummated by a group of pioneer gear builders. The merger is headed by F. W. Sinram, formerly president of the Van Dorn & Dutton Co. The name Gears and Forgings, Inc., has been chosen, expressing as it does the complete range of facilities of this new organization. From raw materials to finished gears will now be an established fact in the gear industry.

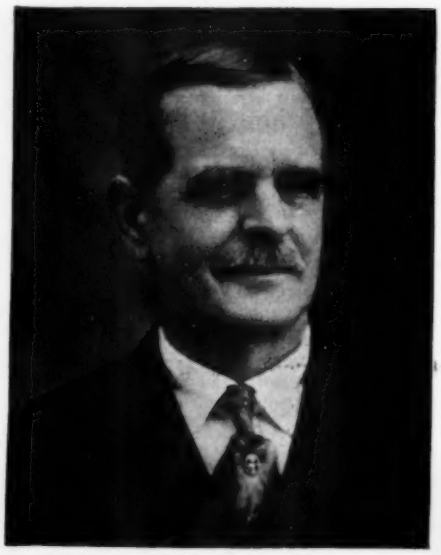
The economies of large scale production, vertical organization, and geographical location promise advantages found to work so successfully in other fields of endeavor. High sales cost, duplication of sales effort, isolated purchases and duplication of plant and manufacturing facilities all contribute to an economic waste which the companies in this merger hope to avoid.

Founded in 1897

The Van Dorn & Dutton Co. was founded in 1897, and has specialized in the production of quality gears for many industries. Their detailed analysis of machine tool power transmission problems, coupled with many years experience and extensive facilities, have enabled them to furnish to many manufacturers of machine tools gears that have added greatly to the value of the machines. The success of this company has been due to a great extent to F. W. Sinram, president and general manager.



F. W. Sinram
President



A. F. Cooke
1st Vice-president

The William Ganschow Co. was organized fifty years ago as the first gear manufacturing company in Chicago. General industrial gears were manufactured at first and the business expanded at regular intervals until this company was one of the largest in the gear field. The plant in Chicago and the new plant in Peoria are both equipped with modern and up-to-date gear manufacturing machinery.

Pioneered Speed Reducer

William Ganschow, president of this company, was one of the first men to realize the possibilities of the industrial speed reducer market. This company has specialized in furnishing gears for replacement, and is equipped to furnish all types—spur, bevel, spiral bevel, etc. The Ganschow Division of Gears and Forgings, Inc. will continue to expand along the lines for which it is particularly fitted.

The Fawcus Machine Co. was organized in Pittsburg in 1901 and has grown into one of the foremost manufacturers of large industrial gears, herringbone gears and special machinery. At present this company has two plants, one in Pittsburg and one in Ford City. Although this company started as a manufacturer of gears, it has expanded its activities to include special machinery, steel mill equipment, mills, strip coilers, gear transmissions, sheet mill drives, machinery for mechanically operated bridges, and heavy mechanical devices for various purposes. A. F. Cooke, vice-president and general manager of this company, has been instrumental in its growth. He will be manager of the Fawcus Division of Gears and Forgings, Inc.

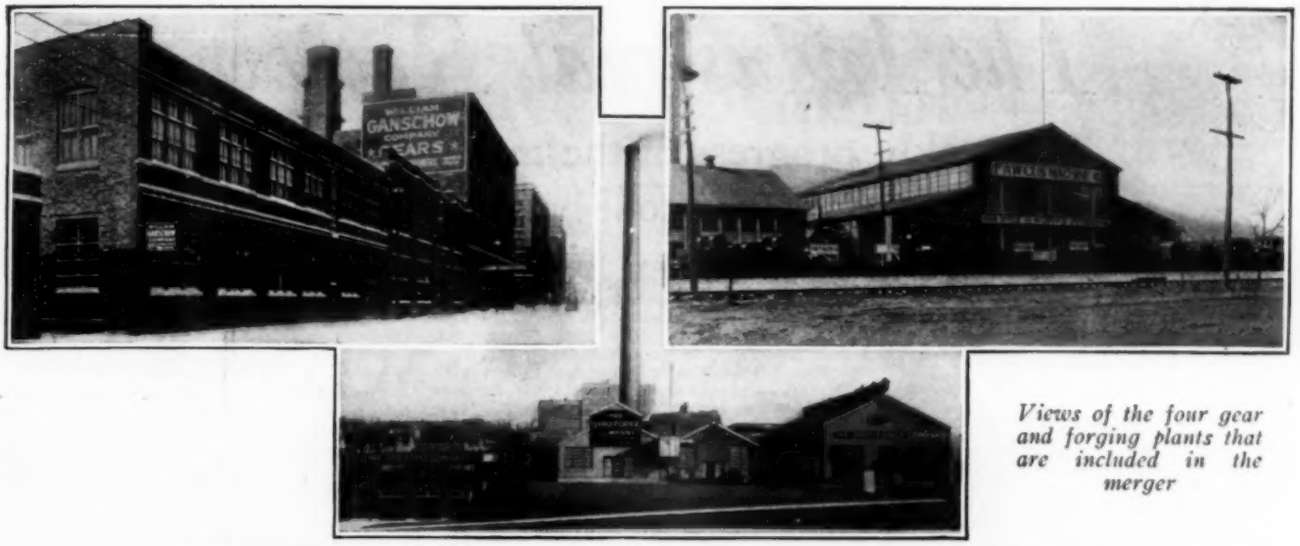
The Ohio Forge Co. started as a one-man, one-hammer shop housed in an old red barn. It is now located on four acres of land. To the efforts of J. M. Clem and S. C. Dalbey the success of this business is due.

Leader in Gear Industry

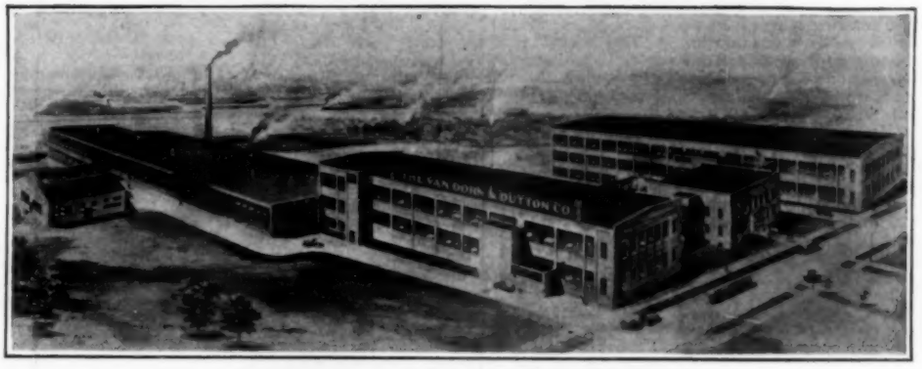
F. W. Sinram, president of Gears and Forgings, Inc., has been a leader in the American Gear Manufacturers' Association for years. He was elected the first president of the association in 1917 and served continuously until 1923, when he was elected honorary president for life. While spending his entire business life in manufacturing, he has found time to study law, has been admitted to the bar and holds a degree from Baldwin Wallace University. Mr. Sinram was appointed chairman of the War Service Committee of the gear industry and started the work of gear standardization in accordance with Mr. Hoover's gear standardization program. The general offices of Gears and Forgings, Inc., where Mr.

J. M. Clem
3rd Vice-president

William Ganschow
2nd Vice-president



Views of the four gear and forging plants that are included in the merger



Sinram will have his headquarters, will be located in Cleveland on Woodhill Road.

A. F. Cooke, formerly vice-president and general manager of the Fawcus Machine Co., will be first vice-president of the new company and manager of the Fawcus Division. Mr. Cooke has been active in the American Gear Manufacturers' Association for many years and at present is a vice-president. He has been chairman of the herringbone gear committee and has aided materially in the standardization work of the association.

William Ganschow, formerly president of the William Ganschow Co., will be second vice-president of the new company and manager of the Ganschow Division. Mr. Ganschow served on the first gear standardization committee of the A. G. M. A. and was at one time a member of its governing board.

J. M. Clem, founder and general manager of the Ohio Forge Co., will assume his duties with the new corporation as third vice-president and manager of the Ohio Forge Division.

S. C. Dalbey will be a director, and secretary and treasurer of the new company. T. E. Leighton, formerly secretary of the Van Dorn & Dutton Co., enters upon his new duties as a director and assistant secretary and treasurer.

C. F. Goedke, formerly secretary of the William Ganschow Co., will be a director of the new corporation and a district sales manager with headquarters at Chicago. He is well known in the gear industry, being treasurer of the gear association and chairman of its entertainment committee.

S. C. Dalbey
Secretary-Treasurer

H. B. Newell, formerly assistant to Mr. Cooke, will take up his new duties as a director and chief engineer.

Gears and Forgings, Inc. in its various divisions will offer to customers every size and type of industrial gears, ranging from the smallest spur and bevel gears to the largest pinions and racks. As a part of the plan, district sales offices will be maintained at logical points of distribution throughout the United States, affording engineering help on gears and forgings.

Power Conference Set for Chicago

The Midwest Power Conference will be held at Chicago, Feb. 14 to 17, with the Chicago Section of the American Society of Mechanical Engineers as one of the several sponsors. This event, which is held coincidently with the Midwest Power Show is one of the outstanding engineering events of the year.

The conference will be unique this year in that nationally known speakers from outside the engineering field will be included in the program. Among these will be Glenn Frank, president of the University of Wisconsin, and Mrs. J. D. Sherman, of Washington, D. C., president of the General Federation of Women's Clubs.

The conference officers are Major Rufus W. Putnam, president; Alex D. Bailey, vice-president; Geo. F. Pfisterer, secretary; and K. A. Auty, treasurer. The A.S.M.E. representatives on the conference committee are Thomas Wilson and James D. Cunningham.

The Industrial Review

Weekly progress of the machinery and machine tool business

THE following reports, gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

DETROIT

The machinery and machine tool market in Detroit is more optimistic this week than at any time in the past five or six months. Not only are fairly large orders coming in, but there is a decided improvement in general business conditions, in employment and in immediate prospects. A great many of the large automobile manufacturers have placed good sized orders for production equipment and a great many others have been selling cars so rapidly that they will undoubtedly find it necessary to make large purchases of production machinery.

It is estimated by industrial and financial experts here that Michigan will produce nearly 5,000,000 cars in 1928. If this record is achieved it will mean that somewhere between $400,000,000 and $500,000,000 will be spent for labor and equipment. All the things seem to point to this as one of the most prosperous years that Michigan has ever had and if the automobile trade flourishes to this extent it seems likely that the machinery dealers will not be far behind. Employment is gaining steadily, the small shops are becoming busy.

CINCINNATI

The majority of machine tool manufacturers in the Cincinnati district report that the market trend has been upward during the past week. While there has been no great gain in sales, considering the trade as a whole, there is a confident feeling that as the year grows older the demand will grow stronger, and gradually a much higher sales level will be reached.

Selling agents report that while there has been no great increase in the local demand in the past week, the market tendency is upward.

The great majority of the week's orders called for single tools and replacements, the principal purchasers being general machinists and miscellaneous users. The sales were well diversified in the matters of sizes and types of tools and were well distributed over the different sections of the country. Several scattering orders for single tools and replacements came from concerns in the automotive industry and a few similar orders came from railroads.

The majority of the manufacturers report that an increased volume of inquiries were received during the week, a feature of these being the fact that their nature and tone indicate an intention to buy without great delay. Some were received from automobile makers and from railroads, but the major portion of them came from general machinists and miscellaneous users.

NEW YORK

Business continues at a surprising rate in this territory. Most dealers are busy on live quotations, and sales since the first of the year have been very good. It is agreed that most current business is coming from the automotive industry, which includes motor car builders and makers of parts and accessories.

The railroads have also been more active than usual and some attractive inquiries from this source have brightened the situation considerably. One list in particular from the Lakawanna R.R. calls for some thirty-five machines, including lathes, grinders, shears, bandsaws, hacksaws, testing machines, drills, forging and bending presses, milling machines and a large steam hammer. The Norfolk & Western, the Jersey Central and the New York Central are mentioned as buyers in the past week.

The Merganthaler Linotype Co. is also in the market for some tools for its new shops which have just been completed. This company is also working out a program of complete motorization of its machine tool equipment.

Industrial users provide a regular demand for lathes, grinders, radial drills, shapers and electric material handling machinery.

MILWAUKEE

The metal working equipment trade has found reason to feel encouraged by the developments of the early days of the new year. Sales have been at least equal to expectations, while inquiries give promise of a substantial volume of new business. The general predicition that machine tool prices are due for an advance undoubtedly has caused some prospective buyers to take care of their immediate requirements.

The automobile industry has shown evidences of a revival of interest and while actual sales so far have not been of unusual volume, the tool trade is confident that it will be a more important factor this year than it was last. Motor car factories in the past year or two have been able to keep their production schedules in a close relation to the current demand, and the results of the national shows and the local expositions so far held are reported to be at least equal to expectations. Spring output schedules now being formed to meet the demand will be the basis of tool buying in the next two months.

PHILADELPHIA

The Philadelphia machinery and machine tool market displayed a greater optimism over the outlook for future business during the last two weeks than it has expressed in months. The post-holiday period brought some orders for forging hammers and a few scattered orders from industrial centers of the Middle-West.

Some shapers and roller bearings were in the list of sales reported by a large producer of that equipment, and there were some purchases of locomotive repair equipment from one of the Eastern carriers.

Reports were general that inquiries received during the last week of 1927 and in the first few days of this year contained much that was hopeful for the development of orders. While the situation at present is regarded as hopeful in this market, the producers are cautious in making their predictions for the future.

CHICAGO

Within the last week a noticeable improvement has developed in the machine tool situation. Inquiries are being received in larger number, and on their surface indicate that the tools inquired for will be needed shortly. Selling is reported as being better than for some weeks past. An executive of one midwest concern manufacturing several lines of tools informed the writer that since January first his house had made several important sales to industrialists and automobile manufacturers, inquiries for some of which had been received as far back as November of last year, and had been classed as dubious in the matter of results.

So far as can be ascertained, none of the Western railroads has issued a list of shop equipment requirements, but such action is not expected until the 1928 budgets have been approved. Railroad buying thus far this year has been limited to two or three heavy duty tools for which inquiry was made some time ago.

CLEVELAND

The machinery and machine tool business was fairly active during the first two weeks of the new year. A few substantial and a sprinkling of single orders have been received. A few of the orders received have been pending for a time and it is assumed that some of the sales can be attributed to new appropriations made for the year. A majority of the tools were for replacement purpose. The National Lamp Co. purchased two lathes.

Reports obtained from dealers and manufacturers of punch press equipment show that 1927 was one of the biggest years and it exceeded 1926 in sales by a large margin. Business in the automatic line is picking up steadily and January is expected to be a good month. Industrial production is on the increase according to the city employment bureau.

BUFFALO

Conditions in the machine tool trade in Buffalo during the first of January were quiet and somewhat spotty. One or two dealers reported a good volume of small orders during late December and early January. Practically all agree that the future looks exceptionally good. Inquiries are coming in and there is every indication that this February will be much better than that of last year.

Bad weather held up the work of several contractors during most of December but an average temperature of about 45 deg. in the first part of January stimulated activity in this field.

In the electrical field business is not quite as good as in the general machine tool field.

EASTERN NEW ENGLAND

According to leading machine tool houses in the Eastern New England section business in this branch of the machinery industry has, so far this month, failed to respond to the optimistic outlook which was forecast in the latter part of December. However, quotations which had been issued the first of this month and late in December, 1927, are ultimately expected to result in at least a few closings before February.

Business in machine shop supplies continues brisk; transactions, while not increasing in volume, at least are on a par with those of the past few weeks.

WESTERN NEW ENGLAND

Orders for new machinery and machine tools were few during the past week in the Western New England section. Inquiries covering prospective business have also been light. Buyers are tardy in placing orders to cover old lists. An Eastern railroad, however, is in the market for several tools, some of which will cost up to $15,000.

Dealers are not complaining despite the fact that business is relatively light. Keen competition with resulting smaller profits is the main factor of contention. "There is more business than there is profit in the business," is the way one dealer describes the situation. A number of public sales of machinery hereabouts has placed many tools on the market at a low figure. Beyond these points the outlook remains satisfactory. Industries contemplating expansion are going about it in a wholehearted manner, and all signs point to better sales.